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An Economic Analysis of Creamery Operations in Manitoba, Saskatchewan and Alberta

by
C. V. PARKER

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MAP OF THE THREE PRAIRIE PROVINCES SHOWING

CREAMERIES OPERATING IN 1935

- CREAMERIES INCLUDED IN STUDY
- OTHER CREAMERIES
- RAILWAYS

A L B E R T A S A S K A T C H E W A N M A N I T O B A

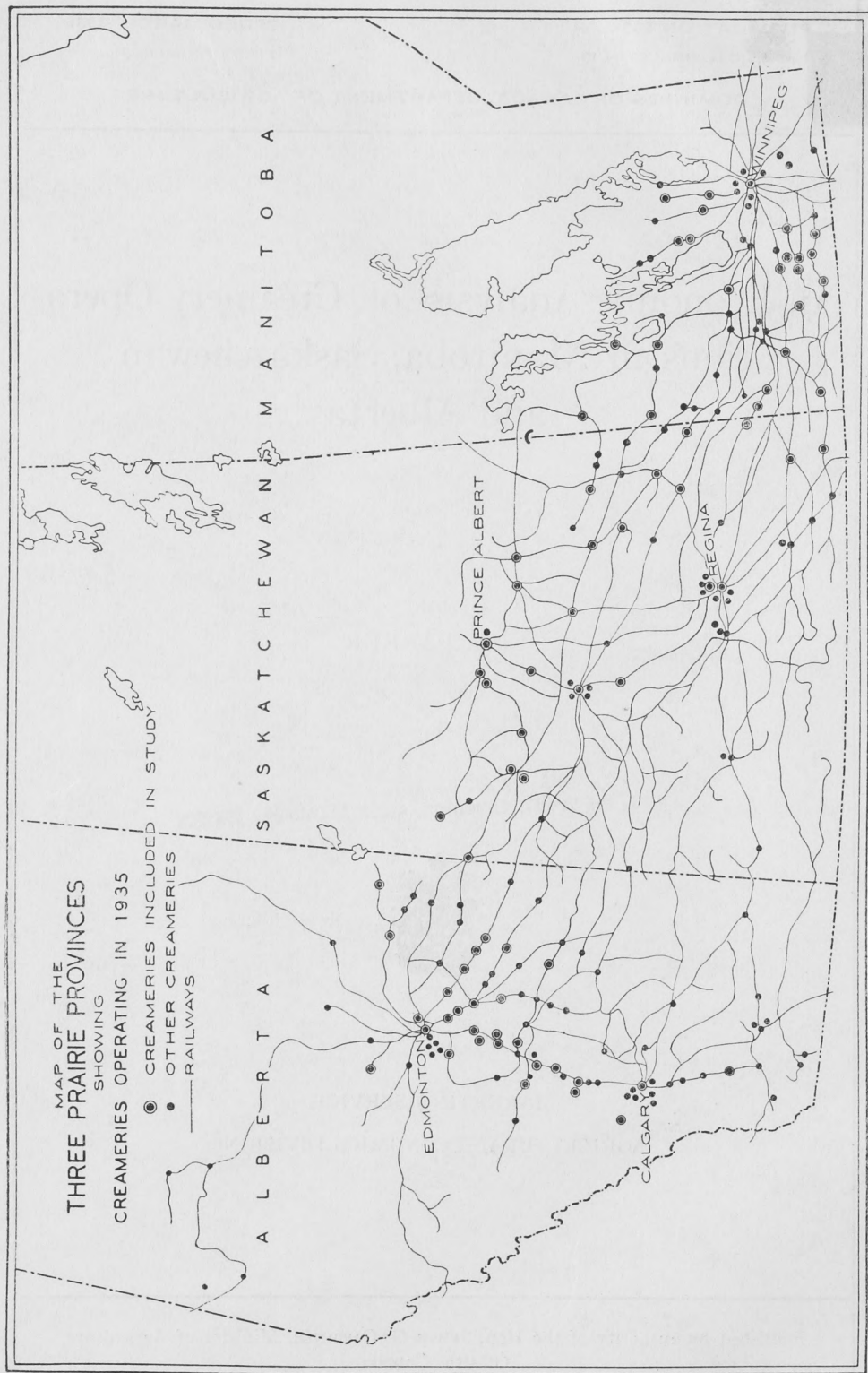
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An Economic Analysis of Creamery Operations in Manitoba, Saskatchewan and Alberta

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FOREWORD

At a meeting of representatives of the Dominion and Provincial Departments of Agriculture and other organizations and institutions throughout Canada interested in agricultural development held in Toronto in 1932, a resolution was passed requesting the Economics Branch to co-operate with the Dominion and Provincial Dairy Branches and other institutions in obtaining information concerning the costs incurred and margins in the marketing of dairy products. As a result of this resolution, studies of cheese factory operations in Ontario and Quebec and of creamery butter production costs in New Brunswick were undertaken and reports issued in 1933 and 1934. In the fall of 1934 field work was started on a study of creamery operations in the provinces of Manitoba, Saskatchewan and Alberta. The study was conducted jointly by the Dairy Branches of the Departments of Agriculture for the three Prairie Provinces, the Rural Economics Division of the universities of the provinces and the Dairy and Economics Divisions of the Dominion Department of Agriculture. A preliminary report on this project was presented at dairy conventions in the provinces concerned in January and February of 1935 and statements were published in *The Economic Annalist*, September, 1935, Volume V, No. 3, and August, 1937, Volume VII, No. 4. This bulletin represents the final report on this project and the fourth in the series resulting from the resolution above mentioned.

An Economic Analysis of Creamery Operations in Manitoba, Saskatchewan and Alberta*

By C. V. PARKER

The three Prairie Provinces, Manitoba, Saskatchewan and Alberta, are known chiefly for the production of grain, particularly wheat. Specialized dairy farming is not the general practice in these provinces. However, dairying assumes an important rôle in that local requirements for dairy products are met and, in the case of creamery butter, a surplus above local requirements is produced. In 1936, the gross value of dairy products totalled \$43,312,000, of which \$15,638,000 represented the output of creamery butter. The production for that year amounted to 72,238,000 pounds or slightly over one-third of the total volume of 248,740,500 pounds of creamery butter produced in Canada.¹ In contrast with this, the province of Manitoba in 1900 produced only 1,557,000 pounds, while the area now comprising Saskatchewan and Alberta, then known as the Northwest Territories, contributed 745,134 pounds, making a total for the prairie region of 2,302,144 compared with 36,066,739 pounds for the whole of the Dominion for that year. The Prairie Provinces are now the main surplus creamery butter producing area in Canada.

The first creamery in the area under study was established in Manitoba at St. Pierre in 1886. In 1890 a creamery was started at Saltcoats, Saskatchewan. A combined butter and cheese factory commenced operations at Innisfail, Alberta, in 1894.

The first creameries started in the "Territories" encountered financial difficulties in the course of a year or two and failure was acknowledged; as a result the Dominion Government took over their operation in 1897. Money was advanced to pay off pressing debts and to make loans to new creameries. The Dairy Commissioner for the Dominion was authorized to manage the creameries. Confidence was restored to the young industry and by 1905, when the Dominion gave up active control, a number of creameries had been assisted to independence and stability.²

The Provinces of Saskatchewan and Alberta continued the assistance after 1905 in a modified form. At that time there were five creameries in Saskatchewan and 42 in Alberta, 18 of which were operated co-operatively by the Department of Agriculture.³ The Saskatchewan Government creameries were taken over by a co-operative organization in 1917, while in Alberta the Government discontinued operation and management of co-operative creameries in 1911.

The Province of Manitoba has had no Government operated creameries, but assistance was extended to the industry during the period of development. Commencing in 1893 a loan of \$500 was given each new creamery established, and creameries were exempt from taxation from 1893 until 1920.

* Those assisting with field work in connection with this study were: W. E. Browne, Dairy Division, Ottawa; C. S. Prodan, Dairy Branch, Manitoba; H. S. Hanna, W. F. Ferris, J. Ed. Ridley and L. M. Silcox, Dairy Branch, Saskatchewan, and Geo. W. Scott, Dairy Branch, Alberta. Acknowledgement is also made of the assistance rendered by Dr. H. C. Grant, University of Manitoba, and Glen H. Craig, Lecturer, Department of Political Economy, University of Alberta.

¹ Monthly Bulletin of Agricultural Statistics, Dominion Bureau of Statistics, March, 1937.

² The Dairying Industry of Canada 1911, by J. A. Ruddick.

³ Development of the Dairy Industry in Western Canada, address delivered by E. L. Love, General Manager, Woodland Dairy Limited, Edmonton, Alta., at the Annual Convention of the Canadian Produce Association, Toronto, 1929.

Reason for the Study.—The purpose of this study is to present actual figures on creamery operations in the three Prairie Provinces; Manitoba, Saskatchewan and Alberta. This includes a presentation of the costs involved in manufacturing butter, the cost of gathering the cream, the returns to patrons and the profit or loss on creamery operations. One of the important objectives of the study is the determination of the effect of volume of output on the cost of manufacturing butter. To deal with this question, all factors must be taken into consideration from the time the cream is received from the farmer until it is sold in the form of butter from the creamery.

Scope of the Study.—It is realized at the outset that no hard and fast rule can be laid down from the findings of this study as to what is the most efficient size of creamery. One reason for this is that operating efficiency is not the only factor that has to be taken into account. The cost of gathering the raw product is of vital concern in an area like the Prairie Provinces, where the farm population is scattered and where dairying is not a major operation on the farms. Thus the districts from which supplies of cream are drawn cover a large area and the gathering cost for the quantity of cream necessary to ensure minimum manufacturing costs per unit may be exorbitant. It seems possible that at the present time there may be too many plants to handle in the most economic manner the quantity of cream available, but of course, it is difficult to estimate what the result would be if creameries were situated so that no overlapping would occur between creamery districts. It is believed that this study, which deals only in a general way with efficiency of operation, will nevertheless, throw some light on the question of what volume of output is likely to be most efficient under existing conditions.

A much more detailed analysis would have to be made to determine more accurately what constitutes efficiency in the use of plant equipment and labour. For instance, a creamery may only be operating at one-half or three-quarters of its capacity, and what the effect in cost would be if it were used to capacity has not been considered in the present study. Cost per unit would naturally be lower in such a plant if it were working at full capacity.

Method of Study.—Records from 91 of the 210 creameries operating in 1933 were obtained by personal visit to the creameries, and 78 of these records have been used in the study. The records cover the 1933-34 fiscal year of the creameries and were obtained in the fall of 1934. Details were obtained on output of butter and receipts and expenditures for the year.

VOLUME OF BUSINESS

The measure of size of business used in this study is volume of butter produced. The 78 factories included in the survey had a total production of 27,338,967 pounds of butter in 1933, or an average of 350,500 per plant (Table 1). This figure is somewhat higher than the average for the 210 creameries operating in the Prairie Provinces in the same year. The total production of butter in these 210 creameries was 60,120,000 pounds or an average of 286,300 per creamery.⁴ The difference may be explained by the fact that the survey sample of 78 factories contains only one-third of the factories operating within the Prairie Provinces having an output less than 200,000 pounds, whereas about one-half of the factories having a production of more than 200,000 pounds per annum are included. In other words, with respect to the volume of output the sample does not accurately represent all the factories in the Prairie Provinces because it contains too large a proportion of the heavier producing creameries. As other

⁴ Statistics of Dairy Factories 1934, Dominion Bureau of Statistics, Dairy Statistics Branch.

factors were considered, such as distribution of factories both between and within provinces, so that conditions in all areas would be taken into account, it is believed that the sample is sufficiently representative for the purpose of this study.

TABLE 1.—DISTRIBUTION OF 78 FACTORIES ACCORDING TO VOLUME OF BUTTER PRODUCED IN PRAIRIE PROVINCES—1933

Production per factory in thousands of pounds	No. of factories	Total pounds butter made	Average pounds butter per factory
Less than 100.....	4	350,810	87,702
100-199.....	14	2,194,418	156,744
200-299.....	22	5,464,155	248,371
300-399.....	19	6,468,865	340,467
400-499.....	5	2,200,091	440,018
500 and more.....	14	10,660,628	761,473
Total or average.....	78	27,338,967	350,500

In Table 2 the total production of butter in each size-group of factories is distributed according to the percentage manufactured per month. This table indicates that 45.44 per cent of the butter was manufactured during three months of the year—June, July, and August. In April, May, September, and October, 31.67 per cent was made. In other words 77.11 per cent of the output occurred during the period April to October inclusive, while the remainder (22.89 per cent) was produced in the other five months of the year. There was no significant difference in the percentage distribution of production in the various size-groups.

TABLE 2.—PERCENTAGE DISTRIBUTION OF BUTTER MANUFACTURED BY MONTHS FOR FACTORIES CLASSIFIED ACCORDING TO VOLUME OF PRODUCTION—PRAIRIE PROVINCES 1933

Months	Production per factory in thousands of pounds						
	Less than 100	100-199	200-299	300-399	400-499	500 and more	All factories
	%	%	%	%	%	%	%
January.....	4.00	4.62	4.52	4.39	4.74	4.65	4.56
February.....	4.07	4.48	4.46	4.59	4.51	4.68	4.58
March.....	4.98	5.87	5.89	5.97	6.25	5.88	5.92
April.....	5.35	6.56	6.18	6.31	6.52	6.71	6.47
May.....	7.83	9.27	9.78	9.51	9.49	10.02	9.72
June.....	16.74	16.33	16.31	16.50	16.22	15.89	16.19
July.....	17.88	15.60	15.88	16.01	16.69	16.26	16.13
August.....	15.83	13.19	12.53	13.12	13.57	13.22	13.12
September.....	10.78	9.89	9.36	9.40	8.70	8.67	9.11
October.....	5.40	6.82	6.65	6.41	5.67	6.30	6.37
November.....	3.68	3.77	4.33	4.02	3.72	4.00	4.02
December.....	3.46	3.60	4.11	3.77	3.92	3.72	3.81
Total or average.....	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Number of Patrons and Cream Supply.—Figures on the number of patrons supplying cream to factories in 74 Prairie Province creameries is contained in Table 3. A total of 47,490 patrons supplied cream to these plants in 1933. The average delivery of butterfat per patron for the year was approximately 440 pounds, which, converted to butter amounts to about 540 pounds. When the pounds of butter made was compared with the number of patrons in each size-group of factories, it was found that in those having the smallest

volume of production there were only 289 pounds of butter manufactured for each patron delivering cream, whereas in the largest size-group of factories the figure was 626 pounds (Table 4). With the exception of the third size-group there was a progressive increase in the amount of butter manufactured per patron as the volume of production increased. This would seem to indicate that one of the factors influencing size of business per creamery is definitely linked up with the size of the dairy business on the individual farms. Apparently the factories in the large size-groups obtain cream from a proportionately greater number of large-scale producers than do the smaller volume creameries, and it would appear that the large factories are situated in areas more adapted to dairying. A study of types of farming and sources of butterfat supply would be necessary to determine to what extent this is true.

TABLE 3.—NUMBER OF PATRONS SUPPLYING CREAM TO FACTORIES WITH DIFFERENT VOLUMES OF PRODUCTION—PRAIRIE PROVINCES 1933

Production per factory in thousands of pounds	Number of factories	Number of patrons	
		Total	Number per factory
	No.	No.	No.
Less than 100.....	4	1,217	304
100-199.....	13	4,750	366
200-299.....	21	8,793	419
300-399.....	19	13,824	728
400-499.....	5	3,966	793
500 and more.....	12	14,940	1,245
Total or average*	74	47,490	642

* Four of the 78 records did not have this information.

The number of patrons per creamery in the 78 plants included in the survey was found to be 642. In making this calculation patrons who delivered cream only for brief periods were excluded. The returns for all of the 212 creameries operating in 1934 in the Prairie Provinces show that the average number of patrons per creamery was 513.⁵ This difference may be explained by the fact that the average size of factory is larger for the survey sample than it is for all factories in the Prairie Provinces.

TABLE 4.—COMPARISON OF ANNUAL PRODUCTION OF BUTTER AND NUMBER OF PATRONS PER CREAMERY PRAIRIE PROVINCES 1933

Production per factory in thousands of pounds	Number of factories	Pounds of butter made	Number of patrons	Pounds of butter per patron
	No.	lbs.	No.	lbs.
Less than 100.....	4	350,810	1,217	289
100-199.....	13	2,046,999	4,750	431
200-299.....	21	5,243,505	8,793	596
300-399.....	19	6,468,865	13,824	468
400-499.....	5	2,200,091	3,966	555
500 and more.....	12	9,349,324	14,940	626
Total or average*	74	25,659,594	47,490	540

* Four of the 78 records omitted.

Creamery capacity is not only influenced by the number and size of individual farmers' dairy businesses, but also by the competition for the supply of

⁵ Statistics of Dairy Factories 1934, Dominion Bureau of Statistics, Dairy Statistics Branch.

butterfat within an area. The figures obtained in this survey are inadequate to make a detailed study regarding butterfat supply within an area and the effect of competition upon creamery capacity. However, the information presented below gives some idea of the competition for butterfat within creamery districts.

The classification of creameries according to place of operation which appears in Table 5 and other tables throughout the report requires some explanation. Regulations concerning the incorporation of centres in Western Canada vary; hence for purposes of this study the terms city, town, and village are defined as follows:—

City Creameries are those situated in Winnipeg, Edmonton, Calgary, Regina and Saskatoon.

Town Creameries are those situated for the most part in centres ranging in population from 1,000 to 2,500. This class also contains four creameries in places with a population from 5,000 to 10,000 persons.

Village Creameries are those situated in centres having less than 1,000 persons.

In Table 5 is shown the average number of dairy plants of all kinds situated within a 40-mile radius of creameries having various volumes of production, and for the same creameries classified according to place of operation. For instance, a creamery in the group having a production less than 100,000 pounds of butter had an average of two dairy plants situated within a 40-mile radius. The average for all creameries was 5.2 dairy plants. The average city creamery had 10.2 competing dairy plants within a radius of 40 miles, while the figures for town and village creameries were 5.3 and 4.1 respectively. The concentration of milk plants in large cities may be attributed to the requirements of the fluid milk market. Most fluid milk plant owners operated a creamery in conjunction with their business.

TABLE 5.—AVERAGE NUMBER OF DAIRY PLANTS SITUATED WITHIN A 40-MILE RADIUS OF FACTORIES CLASSIFIED ACCORDING TO VOLUME OF BUTTER PRODUCED AND ACCORDING TO PLACE SITUATED—PRAIRIE PROVINCES 1933*

Production per factory in thousands of pounds	Number of factories	Number reporting information	Dairy plants within a 40-mile radius† average per factory
Less than 100.....	4	2	2.0
100-199.....	14	12	3.8
200-299.....	22	21	6.0
300-399.....	19	19	5.8
400-499.....	5	4	2.5
500 and more.....	14	14	5.3
All factories.....	78	72	5.2
City factories.....	8	8	10.2
Town factories.....	25	24	5.3
Village factories.....	45	40	4.1

† Dairy plants include other creameries, cheese factories, condenseries, or fluid milk plants.

NOTE.—The number of dairy plants, situated within a radius of 40 miles ranged from none to 14 for individual creameries.

VALUE OF CREAMERY PLANT

Figures in Tables 6 and 7 represent operators' estimates of the capital invested in creamery plants. At the time the records were taken creamery managers estimated the "present" valuation of the equipment used for butter manufacture, office equipment, land, and the proportion of the building utilized for the manufacture of butter. In many of the plants butter manufacture was the only business carried on, but in some factories, public cold storage, cheese departments, or market milk businesses were operated as well. It was necessary to obtain a division of the capital invested in order that a fair charge could be made for the use of capital in arriving at the cost of manufacturing butter. The method of arriving at depreciation and interest charges will be discussed later.

For the 78 factories the capital invested amounted to \$907,664 or an average of \$12,606 per creamery. The distribution of capital was as follows: land, 5.1 per cent; buildings, 52.0 per cent and equipment, 42.9 per cent. This relationship between land, equipment and buildings varied for creameries in different size-groups. There was some indication that the proportion invested in buildings in smaller plants was less than in larger units while in the case of equipment the reverse was true to a certain extent. However, the relationship was not definite enough in all size-groups to give the statement much force.

TABLE 6.—TOTAL CAPITAL INVESTMENT IN 72 CREAMERIES AND AVERAGE VALUE PER PLANT—PRAIRIE PROVINCES 1933*

	Capital invested		
	Total	Average per factory (72 factories)	Per cent of total
	\$	\$	%
Land.....	46,431	645	5.1
Creamery buildings.....	465,721	6,468	51.3
Other buildings.....	6,637	92	0.7
Total buildings.....	472,358	6,560	52.0
Plant equipment.....	370,451	5,145	40.8
Office equipment.....	18,424	256	2.1
Total equipment.....	388,875	5,401	42.9
Total capital.....	907,664	12,606	100.0

* These figures represent the present value of land, equipment and buildings as estimated by creamery operators. Where equipment or real estate was used for other purposes as well as for butter manufacture only a portion of the total valuation was allocated to the creamery plant. Six rented creameries have been omitted from this tabulation.

The average investment for creameries situated in cities, towns, and villages was as follows: city creameries, \$34,258; town creameries, \$13,926 and village creameries, \$8,634. The investment per pound butter produced was 5.61 cents for city creameries, 3.44 cents for town creameries, and 2.94 cents for village creameries. City factories had relatively more invested in land and buildings than had town and village creameries.

A comparison of capital invested with volume of production brings out some interesting points which are presented in Table 8. Here it may be seen that plants having a production less than 100,000 pounds had a capital investment of 7.46 cents per pound of butter manufactured, while in the largest volume group in which production exceeded 500,000 pounds the figure was 2.90 cents. The average investment per pound butter for all creameries was 3.52 cents. The investment in equipment per pound butter manufactured showed a decrease with every increase in volume of butter made. With the exception of the

300,000-399,000 pound volume group a similar decline occurred in the case of capital investment in buildings, although the rate of decline was not quite as great as in the case of equipment. The investment in land on a per pound butter manufactured basis fluctuated between the various groups of creameries. The figure was high for plants of very small output and it was also high in volume groups in which there were city plants.

TABLE 7.—AVERAGE CAPITAL INVESTMENT IN LAND, BUILDINGS AND EQUIPMENT FOR CREAMERIES CLASSIFIED ACCORDING TO SIZE OF BUSINESS AND PLACE SITUATED—PRAIRIE PROVINCES 1933

Production per factory in thousands of pounds	Number of factories	Capital invested in*				Percentage of capital invested in			
		Land	Buildings	Equipment	Total	Land	Buildings	Equipment	Total
		\$	\$	\$	\$	%	%	%	%
Less than 100.....	4	300	3,050	3,188	6,538	4.6	46.6	48.8	100.0
100-199.....	13	174	3,488	3,149	6,811	2.6	51.2	46.2	100.0
200-299.....	19	309	4,159	4,866	9,334	3.3	44.6	52.1	100.0
300-399.....	17	1,117	7,604	5,320	14,041	8.0	54.1	37.9	100.0
400-499.....	5	150	7,420	5,884	13,454	1.1	55.2	43.7	100.0
500 and more.....	14	1,239	12,102	8,777	22,118	5.6	54.7	39.7	100.0
All factories.....	72	645	6,560	5,401	12,606	5.1	52.0	42.9	100.0
City factories.....	6	3,657	21,637	8,964	34,258	10.7	63.2	26.1	100.0
Town factories.....	25	649	7,562	5,715	13,926	4.7	54.3	41.0	100.0
Village factories.....	41	202	3,744	4,688	8,634	2.3	43.4	54.3	100.0

* Only amounts invested in equipment and portion of buildings used for butter manufacture were included.

† Six rented plants were omitted.

TABLE 8.—CAPITAL INVESTMENT EXPRESSED IN CENTS PER POUND OF ANNUAL BUTTER PRODUCTION FOR CREAMERIES CLASSIFIED ACCORDING TO PRODUCTION PER FACTORY AND PLACE SITUATED—PRAIRIE PROVINCES 1933

Production per factory in thousands of pounds	Number of factories	Capital value in cents per pound of butter produced			
		Land	Buildings	Equipment	Total
Less than 100.....	4	0.34	3.48	3.64	7.46
100-199.....	13	0.11	2.21	2.00	4.32
200-299.....	19	0.12	1.66	1.94	3.72
300-399.....	17	0.33	2.23	1.56	4.12
400-499.....	5	0.03	1.69	1.34	3.06
500 and more.....	14	0.16	1.59	1.15	2.90
All factories.....	72	0.18	1.83	1.51	3.52
City factories.....	6	0.60	3.54	1.47	5.61
Town factories.....	25	0.16	1.87	1.41	3.44
Village factories.....	41	0.07	1.27	1.60	2.94

INTEREST AND DEPRECIATION

Interest on mortgages or on head office accounts appear in the operating statements under the heading "Other Expense," but no account has been taken of these items in the cost statements. Instead, a straight 6 per cent rate was charged on the present value of land, equipment and buildings. This is a general practice in most cases when the cost of producing a product is being determined.

The depreciation charges appearing in the operating statements were the actual amounts allowed by the companies. The methods which companies used to charge off depreciation differed so widely that it was necessary to set up a uniform method for use in the cost statement. Depreciation on equipment was calculated on the "years future use basis." Present values and the number of years of future use were obtained for the major items of equipment, and by dividing the years into the present value, a depreciation figure for the year of study was obtained. Depreciation on frame buildings was charged at 5 per cent

and on brick structures at 3 per cent of the present value. The sum total of the depreciation charges calculated by the above methods corresponded closely with the total amount of depreciation charged off by companies.

COST OF MANUFACTURING BUTTER

The cost of manufacturing butter may be influenced by many factors. Among these are: volume of production, efficiency in use of plant and equipment and the costs of individual items making up the total cost of manufacture. One of the purposes of this study is to determine the effect of volume of output on the cost of operation. It is not the intention here to make a detailed analysis of labour, fuel and other costs, because for the most part, the unit cost of these items will not differ greatly for creameries situated in the rural areas of the three Prairie Provinces. In cities, on the other hand, it might be expected that labour rates and taxes would be somewhat higher than in country plants. A separate analysis of manufacturing costs classifying creameries according to place of operation has been made in order to determine if this factor influences costs. No attempt has been made in this study to determine the general efficiency of creameries by comparing the present volume of output with the maximum capacity.

In this study, cost of manufacturing butter includes all items of expense from the time the cream is received at the creamery until the butter is packed

TABLE 9.—MAIN ITEMS OF EXPENSE IN MANUFACTURING BUTTER AND AVERAGE COSTS FOR FACTORIES IN VARIOUS PRODUCTION GROUPS—PRAIRIE PROVINCES 1933

Items of cost	Production per factory in thousands of pounds						
	Less than 100	100-199	200-299	300-399	400-499	500 and more	All factories
	\$	\$	\$	\$	\$	\$	\$
Plant wages.....	1,195 74	2,064 23	2,600 00	3,076 02	3,467 67	5,788 92	3,175 77
Materials and miscellaneous—							
Boxes and liners.....	428 33	696 95	1,006 44	1,411 39	1,977 80	3,411 16	1,513 77
Supplies.....	277 66	315 56	553 06	657 60	1,170 38	1,378 12	709 45
Power, light, fuel.....	326 98	473 20	796 74	1,082 22	1,343 22	2,172 87	1,066 15
Repairs.....	136 67	287 62	349 42	494 89	437 05	763 01	442 70
Grading cream.....	75 65	164 73	286 15	533 59	572 76	847 52	432 97
Sundry.....	47 05	67 23	196 06	282 57	202 20	413 66	225 82
	1,292 34	2,005 29	3,187 87	4,462 26	5,703 41	8,986 34	4,390 84
Overhead—							
Taxes.....	107 21	71 14	178 30	238 11	250 16	500 45	232 42
Insurance.....	112 98	163 12	209 32	271 76	256 52	410 65	250 46
Depreciation.....	494 75	507 43	670 14	983 74	961 40	1,446 00	866 26
Interest.....	392 29	405 18	582 16	886 28	807 25	1,327 06	762 86
	1,107 23	1,146 87	1,639 92	2,379 89	2,275 53	3,684 16	2,112 00
Administration—							
Salaries.....	350 13	319 28	581 08	824 06	957 73	2,441 90	939 57
Office supplies.....	41 02	97 21	210 96	193 77	273 21	341 06	204 98
Postage and telephone.....	94 98	148 37	224 43	485 33	622 09	1,197 65	467 86
Travelling.....	50 95	63 52	58 35	89 35	105 86	234 95	101 20
Head office.....	68 21	154 87	132 47	564 85	1,225 21	742 99	418 15
Sundry.....	27 53	102 28	115 96	260 35	136 39	854 57	278 02
	632 82	885 53	1,323 25	2,417 73	3,320 49	5,813 12	2,409 78
Total cost.....	4,228 13	6,101 92	8,751 04	12,335 90	14,766 90	24,272 54	12,088 39
Number of factories.....	4	14	22	19	5	14	78
Average pounds of butter....	87,702	156,744	248,371	340,467	440,018	761,473	350,500

into 56-pound boxes. Charges for gathering the cream and costs of printing and shipping butter are therefore excluded. Commissions on cream cheques have also been omitted. Details on cost were obtained from factory statements and with the exception of a few items were not changed. Company depreciation charges were not used in the cost statement. The method of writing off depreciation and the charge for interest as used in this study have been described above.

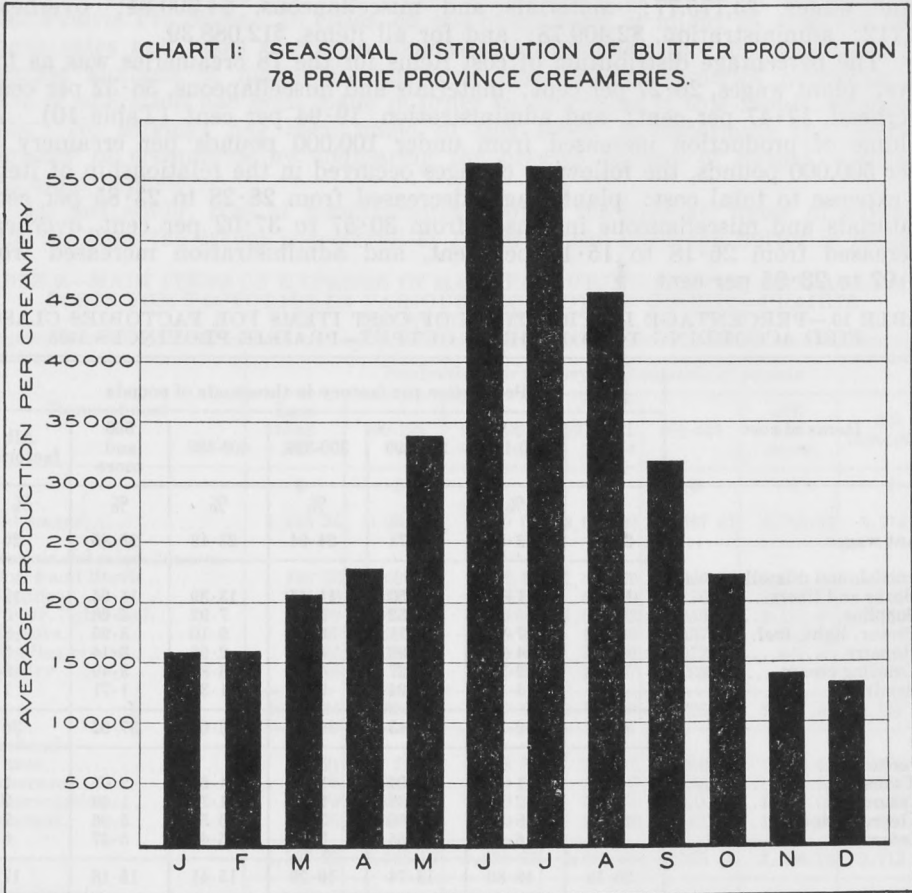
The average costs of manufacturing butter are shown for each volume group of creameries in Table 9. The cost of manufacture was \$4,228.13 for creameries having an output smaller than 100,000 pounds while for creameries with a production larger than 500,000 pounds the figure was \$24,272.54. The average cost for each main group of items for all creameries was as follows: plant wages, \$3,175.77; materials and miscellaneous, \$4,390.84; overhead, \$2,112; administration, \$2,409.78; and for all items, \$12,088.39.

The percentage distribution of cost items for the 78 creameries was as follows: plant wages, 26·27 per cent; materials and miscellaneous, 36·32 per cent; overhead, 17·47 per cent; and administration, 19·94 per cent (Table 10). As volume of production increased from under 100,000 pounds per creamery to over 500,000 pounds, the following changes occurred in the relationship of items of expense to total cost: plant wages decreased from 28·28 to 23·85 per cent, materials and miscellaneous increased from 30·57 to 37·02 per cent, overhead decreased from 26·18 to 15·18 per cent, and administration increased from 14·97 to 23·95 per cent

TABLE 10.—PERCENTAGE DISTRIBUTION OF COST ITEMS FOR FACTORIES CLASSIFIED ACCORDING TO VOLUME OF OUTPUT—PRAIRIE PROVINCES 1933

Items of cost	Production per factory in thousands of pounds						
	Less than 100	100-199	200-299	300-399	400-499	500 and more	All factories
	%	%	%	%	%	%	%
Plant wages.....	28·28	33·83	29·71	24·94	23·48	23·85	26·27
Materials and miscellaneous—							
Boxes and liners.....	10·13	11·42	11·50	11·44	13·39	14·05	12·52
Supplies.....	6·57	5·17	6·32	5·33	7·92	5·68	5·87
Power, light, fuel.....	7·74	7·76	9·11	8·77	9·10	8·95	8·82
Repairs.....	3·23	4·71	3·99	4·01	2·96	3·14	3·66
Grading cream.....	1·79	2·70	3·27	4·33	3·88	3·49	3·58
Sundry.....	1·11	1·10	2·24	2·29	1·37	1·71	1·87
	30·57	32·86	36·43	36·17	38·62	37·02	36·32
Overhead—							
Taxes.....	2·53	1·17	2·04	1·93	1·69	2·06	1·92
Insurance.....	2·67	2·67	2·39	2·20	1·74	1·69	2·07
Depreciation.....	11·70	8·32	7·66	7·98	6·51	5·96	7·17
Interest.....	9·28	6·64	6·65	7·18	5·47	5·47	6·31
	26·18	18·80	18·74	19·29	15·41	15·18	17·47
Administration—							
Salaries.....	8·28	5·23	6·64	6·68	6·49	10·06	7·77
Office supplies.....	0·97	1·59	2·41	1·57	1·85	1·41	1·70
Postage and telephone.....	2·25	2·43	2·56	3·93	4·21	4·93	3·87
Travelling.....	1·21	1·04	0·67	0·73	0·72	0·97	0·84
Head office.....	1·61	2·54	1·51	4·58	8·30	3·06	3·46
Sundry.....	0·65	1·68	1·33	2·11	0·92	3·52	2·30
	14·97	14·51	15·12	19·60	22·49	23·95	19·94
Total cost.....	100·0	100·0	100·0	100·0	100·0	100·0	100·0
Number of factories.....	4	14	22	19	5	14	78
Average pounds of butter.....	87,702	156,744	248,371	340,467	440,018	761,473	350,500

The effect of volume of production is illustrated in Table 11 and Chart 2. The cost of manufacturing a pound of butter decreased from 4.82 cents to 3.18 cents when the output per plant increased from less than 100,000 pounds of butter to more than 500,000 pounds. The range in cost was 1.64 cents. The range in cost from the lowest to highest cost factory was from 2.62 to 6.56 cents or 3.94 cents per pound. A large reduction in cost amounting to 1.32 cents per pound occurred between the group of factories in which production was smaller than 100,000 pounds to the third group in which output ranged between 200,000-299,000 pounds. From the third to fourth group the cost per pound rose from 3.52 to 3.62 cents, and in the fifth and sixth groups the cost declined to 3.37 cents and 3.18 cents per pound respectively.

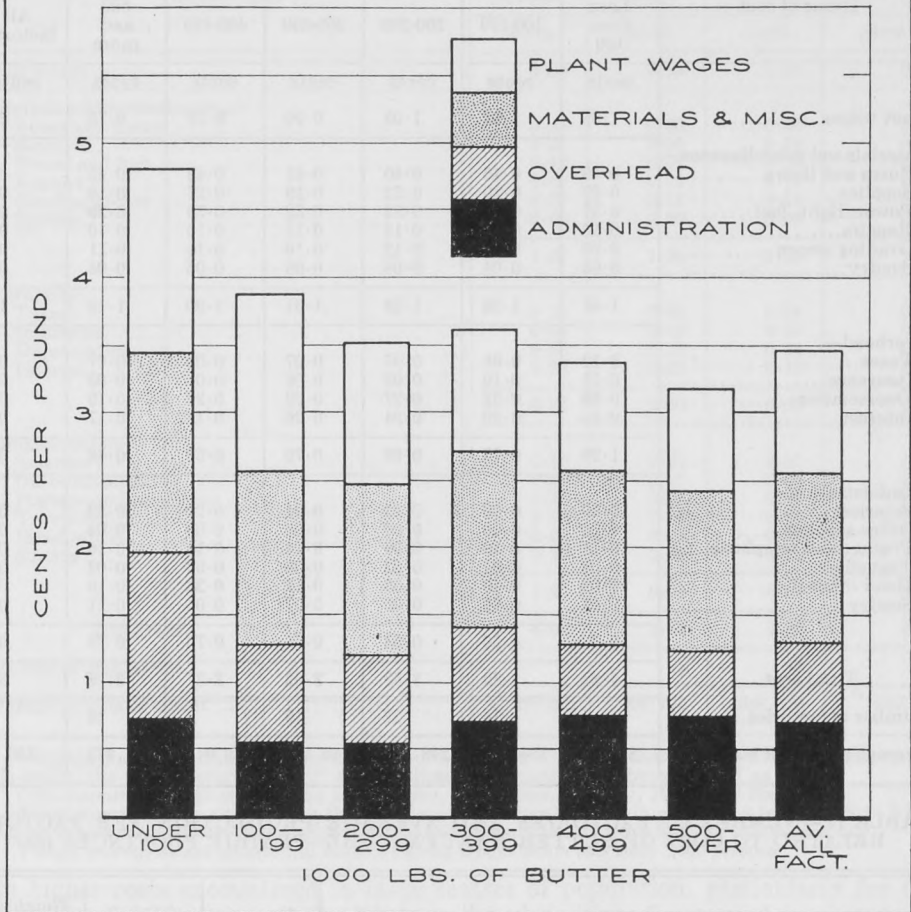


NOTE.—Average production in pounds of butter.

Apparently after a 300,000 pound capacity was reached, more equipment and space was needed. This is indicated by a rise in overhead costs from 0.66 cent per pound to 0.70 cent between the 200,000-299,000 and 300,000-399,000 pound group. Another reason for the higher cost in the fourth group was the increase in head office charges due to a greater number of branch factories in this group.

An examination of the individual items of expense reveals those which are affected when volume is increased. For instance, plant wages decreased from

CHART 2: COMPARISON OF BUTTER MANUFACTURING COSTS IN FACTORIES OF DIFFERENT VOLUMES OF PRODUCTION



1.36 to 0.76 cents per pound butter as volume of production increased from less than 100,000 pounds to more than 500,000 pounds of butter. Overhead items; taxes, insurance, depreciation and interest, showed a marked decrease from 1.26 cents to 0.48 cent, as volume rose. The cost of materials and miscellaneous items remained fairly constant when expressed as a cost per pound butter. Cream grading charges, one item of this group, varied because of the different systems in vogue in the three Prairie Provinces. In Manitoba the charge includes the wages of a cream grader who is stationed at the creamery and who aids in the plant work as well as doing the grading. Alberta, and Saskatchewan, on the other hand, employ graders who visit the creameries at intervals and who do not help in the creamery. Apart from the group containing the smallest output factories, administration costs showed a tendency to rise as volume of output increased. This is accounted for in part by the fact that there are more branch creameries under head office supervision in the larger production groups. Larger organizations usually require a greater amount of book-keeping, which necessitates the employment of more highly paid office staffs.

TABLE 11.—THE RELATION OF VOLUME OF OUTPUT TO COST OF MANUFACTURING A POUND OF BUTTER IN 78 CREAMERIES—PRAIRIE PROVINCES 1933

Items of cost	Production per factory in thousands of pounds						
	Less than 100	100-199	200-299	300-399	400-499	500 and more	All factories
	cents	cents	cents	cents	cents	cents	cents
Plant wages.....	1.36	1.32	1.05	0.90	0.79	0.76	0.91
Materials and miscellaneous—							
Boxes and liners.....	0.49	0.45	0.40	0.41	0.45	0.45	0.43
Supplies.....	0.32	0.20	0.22	0.19	0.27	0.18	0.20
Power, light, fuel.....	0.37	0.30	0.32	0.32	0.30	0.29	0.31
Repairs.....	0.15	0.18	0.14	0.15	0.10	0.10	0.13
Grading cream.....	0.09	0.11	0.12	0.16	0.13	0.11	0.12
Sundry.....	0.05	0.04	0.08	0.08	0.05	0.05	0.06
	1.47	1.28	1.28	1.31	1.30	1.18	1.25
Overhead—							
Taxes.....	0.12	0.05	0.07	0.07	0.06	0.07	0.06
Insurance.....	0.13	0.10	0.08	0.08	0.06	0.05	0.07
Depreciation.....	0.56	0.32	0.27	0.29	0.22	0.19	0.25
Interest.....	0.45	0.26	0.24	0.26	0.18	0.17	0.22
	1.26	0.73	0.66	0.70	0.52	0.48	0.60
Administration—							
Salaries.....	0.40	0.20	0.23	0.24	0.22	0.32	0.27
Office supplies.....	0.05	0.06	0.09	0.06	0.06	0.04	0.06
Postage and telephone.....	0.11	0.10	0.09	0.14	0.14	0.16	0.13
Travelling.....	0.06	0.04	0.02	0.03	0.03	0.03	0.03
Head office.....	0.08	0.10	0.05	0.17	0.28	0.10	0.12
Sundry.....	0.03	0.06	0.05	0.07	0.03	0.11	0.08
	0.73	0.56	0.53	0.71	0.76	0.76	0.69
Total cost.....	4.82	3.89	3.52	3.62	3.37	3.18	3.45
Number of factories.....	4	14	22	19	5	14	78
Average pounds of butter.....	87,702	156,744	248,371	340,467	440,018	761,473	350,500

TABLE 12.—NUMBER OF FACTORIES AND AVERAGE PRODUCTION PER FACTORY RELATED TO COST OF BUTTER MANUFACTURE—PRAIRIE PROVINCES 1933

Costs (Cents per pound)	Average lbs. butter made	Number in class	Weighted average for each class
2.50-2.99.....	477,716	16	2.78
3.00-3.49.....	429,278	22	3.28
3.50-3.99.....	264,635	19	3.73
4.00-4.49.....	245,896	14	4.21
4.50-4.99.....	347,279	4	4.61
5.00 and more.....	130,557	3	6.12
Total or average.....	350,500	78	3.45

NOTE.—Range in costs, lowest to highest, 2.58 to 6.56 cents.

Country and City Plants.—When creameries were classified according to volume of butter produced it was found that as output increased costs per unit decreased. Data in Table 13 indicate that it costs more to manufacture butter in city plants than those in towns and villages despite the fact that volume of production is greater in the former. The fact that creameries are situated in villages or cities has no particular significance in itself. What is important is

TABLE 13.—COST PER POUND MANUFACTURING BUTTER IN CREAMERIES CLASSIFIED ACCORDING TO PLACE OF OPERATION—PRAIRIE PROVINCES 1933

Items of cost	Creameries situated in*			All creameries
	Cities	Towns	Villages	
	cents	cents	cents	cents
Plant wages.....	0.80	0.92	0.93	0.91
Materials and miscellaneous—				
Boxes and liners.....	0.34	0.45	0.45	0.43
Supplies.....	0.21	0.20	0.19	0.20
Power and fuel.....	0.40	0.31	0.26	0.30
Repairs.....	0.13	0.11	0.14	0.13
Grading cream.....	0.10	0.11	0.14	0.12
Sundry.....	0.07	0.06	0.08	0.07
	1.25	1.24	1.26	1.25
Overhead—				
Taxes.....	0.12	0.08	0.04	0.06
Insurance.....	0.09	0.06	0.07	0.07
Depreciation.....	0.28	0.25	0.24	0.25
Interest.....	0.35	0.21	0.18	0.22
	0.84	0.60	0.53	0.60
Administration—				
Salaries.....	0.58	0.21	0.21	0.27
Office supplies.....	0.07	0.06	0.06	0.06
Postage and telephone.....	0.22	0.13	0.11	0.13
Travelling.....	0.05	0.03	0.02	0.03
Head office.....	0.08	0.16	0.10	0.12
Sundry.....	0.20	0.05	0.06	0.08
	1.20	0.64	0.56	0.69
Total cost.....	4.09	3.40	3.28	3.45
Number of creameries.....	8	25	45	78
Average pounds of butter.....	527,501	404,775	288,879	350,500

* Regulations concerning the incorporation of centres in Western Canada vary; hence for purposes of this study, the terms "city", "town" and "village" creameries have been defined as follows:

City creameries are those situated in Winnipeg, Edmonton, Calgary, Regina or Saskatoon.

Town creameries are situated for the most part in centres ranging in population from 1,000 to 2,500. This class also contains four creameries in places with populations of from 5,000 to 10,000 persons.

Village creameries are situated in centres having a population less than 1,000 persons.

the higher costs encountered in large centres of population, particularly for the use of land. The terms "city," "town," and "village," are used in this study for descriptive purposes. Definitions of these terms appear on page 9. In eight city plants which had an average production of 527,501 pounds of butter, the cost of manufacture was 4.09 cents per pound in comparison to 3.40 cents in creameries situated in towns and 3.28 cents in village creameries. Overhead and administration expenses on a unit basis were lower in country plants, materials and miscellaneous items were practically the same, while plant wages were somewhat higher than in city plants. Plant wages were about $\frac{1}{10}$ cent higher in country plants than in city factories. It might be expected that the difference in labour costs would be greater in view of the fact that volume of production was so much higher in city plants than in town and village creameries. However, wage rates were higher in city plants and managers or owners of smaller country plants usually work much longer hours than hired employees in city establishments. Overhead items were 0.84 cent per pound in city plants and 0.53 in village creameries, a difference of 0.31 cent. Administration expenses in city plants were 1.20 cent while in village creameries they were 0.56 cent, a difference of 0.64 cent. City creameries had higher capital costs, and greater expense for office administration.

The difference between the average cost for the 45 village creameries and the average for the 8 city plants included in the study was 0·81 cent per pound, but as previously mentioned the average output in city plants was 527,501 pounds while the production for the village creameries only averaged 288,879 pounds. A further analysis comparing a number of village and town creameries having approximately the same average output as the 8 city plants is shown in Table 14. The results of this comparison indicated that in plants of approximately the same size, manufacturing costs in cities were 4·09 cents per pound, in towns 3·20 cents, and in villages 3·10 cents per pound. There was nearly one cent difference between manufacturing costs in the city and village plants of equal capacity.

TABLE 14.—COMPARISON OF MANUFACTURING COST PER POUND OF BUTTER IN COUNTRY AND CITY PLANTS HAVING APPROXIMATELY THE SAME VOLUME OF OUTPUT—PRAIRIE PROVINCES 1933

	Creameries situated in			Total
	Cities	Towns	Villages	
Cost of manufacturing..... cents	4·09	3·20	3·10	3·37
Number of factories..... No.	8	14	12	34
Average pounds of butter..... lbs.	527,501	525,478	527,883	526,803

TABLE 15.—THE RELATION OF VOLUME OF OUTPUT TO COST OF MANUFACTURING A POUND OF BUTTER, EXCLUDING PLANTS SITUATED IN LARGE CITIES —PRAIRIE PROVINCES 1933

Items of cost	Production per factory in thousands of pounds						All factories
	Less than 100	100-199	200-299	300-399	400-499	500 and more	
	cents	cents	cents	cents	cents	cents	cents
Plant wages.....	1·36	1·32	1·05	0·93	0·79	0·75	0·92
Materials and miscellaneous—							
Boxes and liners.....	0·49	0·45	0·40	0·44	0·45	0·48	0·45
Supplies.....	0·32	0·20	0·22	0·20	0·27	0·17	0·20
Power, light, fuel.....	0·37	0·30	0·30	0·29	0·30	0·26	0·29
Repairs.....	0·15	0·18	0·14	0·15	0·10	0·10	0·12
Grading cream.....	0·09	0·11	0·12	0·14	0·13	0·13	0·13
Sundry.....	0·05	0·04	0·06	0·09	0·05	0·06	0·06
	1·47	1·28	1·24	1·31	1·30	1·20	1·25
Overhead—							
Taxes.....	0·12	0·05	0·06	0·06	0·06	0·06	0·06
Insurance.....	0·13	0·10	0·08	0·08	0·06	0·04	0·07
Depreciation.....	0·56	0·32	0·27	0·27	0·22	0·18	0·24
Interest.....	0·45	0·26	0·21	0·21	0·18	0·15	0·19
	1·26	0·73	0·62	0·62	0·52	0·41	0·56
Administration—							
Salaries.....	0·40	0·20	0·19	0·20	0·22	0·22	0·21
Office supplies.....	0·05	0·06	0·08	0·05	0·06	0·04	0·06
Postage and telephone.....	0·11	0·10	0·09	0·13	0·14	0·13	0·12
Travelling.....	0·06	0·04	0·02	0·03	0·03	0·02	0·02
Head office.....	0·08	0·10	0·05	0·17	0·28	0·11	0·13
Sundry.....	0·03	0·06	0·05	0·06	0·03	0·07	0·06
	0·73	0·56	0·48	0·64	0·76	0·59	0·60
Total cost.....	4·82	3·89	3·39	3·50	3·37	2·95	3·33
Number of factories.....	4	14	20	16	5	11	70
Average pounds of butter.....	87,702	156,744	251,112	342,564	363,315	715,489	330,271

Since the place of operation was found to influence costs so greatly, a separate classification of creameries excluding city plants was made and the results are presented in Table 15. It was found that the average cost of production for creameries excluding city plants was 3·33 cents, a decrease of 0·12 cent per pound from the average with the city plants included. A decrease occurred in each of the size-groups affected, i.e., the 200-299, 300-399, 400-499, and 500 and more, thousand pound groups. The most marked decrease occurred in the group producing 500,000 pounds and more. In this group the cost figure was 3·18 cents per pound with city plants included and 2·95 cents with the city plants excluded, a difference of 0·23 cent per pound.

Provincial Averages.—The average cost of manufacturing a pound of butter in the 78 plants in the three provinces was 3·45 cents and the average production was 350,000 pounds. In 30 Alberta plants the figure was 3·56 cents per pound and the average production 316,303 pounds. The 25 Saskatchewan creameries produced an average of 404,178 pounds at a cost of 3·47 cents per pound, and the average production for 23 factories in Manitoba was 336,757 pounds at a cost per pound of 3·28 cents (Table 16).

TABLE 16.—COST OF MANUFACTURING BUTTER IN THE THREE PRAIRIE PROVINCES
BY PROVINCES 1933

Items of cost	Alberta			Saskatchewan			Manitoba		
	Average	Per cent total	Cost per lb.	Average	Per cent total	Cost per lb.	Average	Per cent total	Cost per lb.
	\$	%	cents	\$	%	cents	\$	%	cents
Plant wages.....	3,025 48	26·83	0·96	3,545 90	25·28	0·88	2,969 49	26·89	0·88
Materials and miscellaneous—									
Boxes and liners.....	1,396 87	12·39	0·44	1,773 86	12·65	0·44	1,383 54	12·53	0·41
Supplies.....	648 85	5·75	0·20	845 89	6·03	0·21	640 13	5·80	0·19
Power, light, fuel.....	967 28	8·58	0·30	1,389 56	9·91	0·34	843 57	7·64	0·25
Repairs.....	426 99	3·79	0·14	439 40	3·13	0·11	466 80	4·22	0·14
Grading cream.....	186 48	1·65	0·06	416 98	2·97	0·10	771 84	6·99	0·23
Sundry.....	251 07	2·23	0·08	177 95	1·27	0·04	244 92	2·22	0·07
	3,877 54	34·39	1·22	5,043 64	35·96	1·24	4,350 80	39·40	1·29
Overhead—									
Taxes.....	262 41	2·33	0·08	286 09	2·04	0·07	134 97	1·22	0·04
Insurance.....	210 20	1·86	0·07	327 85	2·33	0·08	218 83	1·98	0·07
Depreciation.....	786 13	6·97	0·25	1,034 88	7·38	0·26	787 48	7·14	0·23
Interest.....	733 53	6·51	0·23	889 14	6·34	0·22	663 88	6·01	0·20
	1,992 27	17·67	0·63	2,537 96	18·09	0·63	1,805 16	16·35	0·54
Administration—									
Salaries.....	1,117 59	9·91	0·35	895 53	6·38	0·22	755 24	6·84	0·22
Office supplies.....	165 49	1·47	0·05	199 48	1·42	0·05	262 48	2·38	0·08
Postage, telephone.....	359 52	3·19	0·11	660 11	4·71	0·16	400 23	3·62	0·12
Travelling.....	120 10	1·07	0·04	138 18	0·99	0·03	36 34	0·33	0·01
Head office.....	238 34	2·11	0·08	842 73	6·01	0·21	191 17	1·73	0·06
Sundry.....	379 01	3·36	0·12	163 11	1·16	0·04	271 20	2·46	0·08
	2,380 05	21·11	0·75	2,899 14	20·67	0·71	1,916 66	17·36	0·57
Total cost.....	11,275 34	100	3·56	14,026 64	100	3·47	11,042 11	100	3·28
Number of factories..... No.	30			25			23		
Average pounds of butter..... lbs.	316,303			404,178			336,757		

THE PROBLEMS OF CREAM TRUCKING

The cost of transporting cream is of vital concern in an area like the Prairie Provinces, where farm population is scattered and where dairying is not a major operation on the farms. It was pointed out earlier that the average delivery per patron amounted to only 440 pounds of butterfat for the year 1933. In the figures which follow it is shown that only one-third of the butterfat is delivered by the patrons themselves direct to the plant, whereas one-

third is trucked and the remainder shipped by railways. The proportion of cream trucked is much higher for large capacity plants.

The practice of gathering cream by means of trucks is a natural result of the evolution in this mode of transportation. It has meant for many creameries considerable adjustments and changes in operation. Before the advent of trucks, creameries in Western Canada depended mainly on patron deliveries and railway express for cream supplies. The truck, together with the development of all weather highways, has extended the territory from which individual creameries may obtain cream. It has also very materially eliminated distance, lessening the importance of location, so that now two or more creameries may serve a territory which was formerly served by only one. The truck has become a necessary part of the creamery business.

Types of Cream Trucking Services.—There is some variation in the trucking services in the Prairie Provinces.

Manitoba.—There are three types of cream trucking service in Manitoba: (1) creamery-owned trucks, (2) public service vehicles, and (3) farmers' trucks.

Where the trucks are owned by the creameries, the expenses of operation are paid by the creamery and the driver is paid a salary. Some truck drivers make part-payments on trucks and the creamery finances the balance, including payment of licences. Such trucks are operated as commercial trucks. The driver, through the creamery, collects from the patrons a certain charge per pound butterfat (usually 2 cents) or a charge per can of cream.

Public service vehicle trucks, having regular routes specified by law, are operated under rates set by a commission. Usually commodities other than cream are also handled.

Farmers' trucks are those owned by farmers who usually hire a driver. He is paid up to 25 cents per can or up to 2 cents per pound butterfat or less depending on the distance and the condition of the roads.

Saskatchewan.—Trucking services are of two types: creamery-owned trucks and public service vehicles.

For creamery-owned trucks a driver is hired on a salary basis. All expenses are met by the creamery except for a straight service charge of 10 cents per can which is deducted from patrons' receipts.

All trucks gathering cream other than those owned by the creamery are termed "Public Service Vehicles." Applicants for licences to operate public service vehicles must submit a diagram clearly indicating the route or district to be served. Creameries pay for the hauling on the basis of tariffs set by the Highways Traffic Board.* A service charge of 10 cents is deducted from patrons' receipts.

With the exception of the 10 cents per can deduction for service charges, all but two of the creameries in Saskatchewan purchase cream on an f.o.b. shipping point basis.

Alberta.—This Province has four types of cream trucking services: (1) creamery-owned trucks, (2) trucks owned by the driver, (3) farmers' trucks, and (4) public service trucks or buses.

Where the trucks are owned by the creameries, 2 cents per pound butterfat is deducted from patrons' receipts. The driver is on a salary basis. Drivers who own trucks also receive 2 cents per pound butterfat or in some instances a commission per can in lieu of the rate per pound. Creameries make these payments out of deductions from patrons' receipts.

Trucks owned by farmers in Alberta are operated in a manner similar to those in Manitoba. The creamery manager usually deducts 2 cents per pound butterfat, or a certain amount per can as the case may be, from patrons' receipts

* Formerly under the Public Utility Board.

and the total of these deductions is paid by cheque to the trucker. Public service trucks or buses have regular rates ranging from 30 to 60 cents per can according to the distance.

Problems.—The use of the truck in cream hauling has brought with it special problems. The first problem is the method and amount of payment for the service, and closely associated with this is the relationship it bears to the price paid to the producer for cream. Another problem is the overlapping of trucking routes which results from the keen competition for cream supply.

In discussing the last problem first, it is well to point out that except for public service vehicles the routes travelled by cream trucks in the three Prairie Provinces are not specified by law. In Saskatchewan all trucks engaged in hauling cream, except those owned by creameries, are public service vehicles, but in Manitoba and Alberta, there are other trucking services as indicated above. In Manitoba and Alberta most of the cream is hauled either by creamery-owned trucks or trucks owned by the drivers. Truckers usually make their arrangements at the beginning of the season and visit their patrons regularly thereafter. At the start of the season it often happens that two or three trucks visit a farmer in one day soliciting his cream for different creameries. This may not happen when routes become established, but due to the competition for cream supply there may be several trucks from different creameries soliciting cream in a particular district throughout the year. The result is that trucks have to be driven longer distances to assemble an adequate load. This duplication of services in such sparsely settled areas naturally raises already high hauling costs. Part of the costs may be absorbed by truck owners who operate at a loss, or by the creameries, but in the long run the farmer bears the brunt of the high cost of hauling. It seems reasonable to assume that costs could be lowered materially if truck routes were organized so as to minimize duplication. This is made difficult owing to the large number of independent truckers who have no direct connection with the creameries except as solicitors for, or transporters of, cream. A solution, as in a great many similar cases, would seem to entail some kind of regulation.

The problem for payment of trucking services is of real concern to creamerymen. The methods of payment, though few in number, are subject to many variations. The reason for this is the keen competition existing between creameries for cream supply. Cream truckers are offered inducements by factory managers to obtain as much cream as possible. The cream trucker may be guaranteed a certain rate per pound butterfat at the beginning of the season. If the roads get into bad condition the creameryman may help the trucker further by supplying a tank full of gasoline, a daily meal, repairs to the truck or by some other form of bonus. When production of cream decreases, full cans of cream may not be supplied by all farmers and often the payment to the trucker is changed to a fixed rate-per-can basis, thus raising the cost per pound butterfat. These instances are not cited to indicate that truckers are making exorbitant profits or that the creamery men are doing anything unethical, but merely to point out the various methods adopted to meet competition for cream supply. These additional collection expenses are often excluded from the cream trucking accounts, and are placed in accounts for bad debts, automobile accounts and so forth. It is, therefore, very difficult to obtain an accurate accounting of the total cost of trucking cream. Owners of cream trucks often do not make sufficient income to cover all expenses, including depreciation, and so have to receive additional remuneration in the ways listed above. Normally, creamery managers cannot charge their patrons more for hauling cream than their competitors do and losses from this source must, therefore, be absorbed into the general creamery accounts. Creameries having large outputs are able to absorb these losses and still pay the regular price for cream

because they have lower than average unit manufacture costs. Because of this, the benefits of lower unit costs are frequently not passed on to the producer.

Another comment on cream trucking has to do with the relationship existing between the method of deducting charges for hauling and the price paid the farmer for cream. In many cases the amount deducted by the factory varies in accordance with the completion for butterfat. In one area for instance, competition may be so keen that only a portion of the cost of the hauling will be deducted, while in another part of the same creamery district the full charge may be taken off patron receipts. In this way hauling charges are used as a lever to obtain as much cream as possible and the system of paying for cream becomes complicated to say the least.

It was not possible to make a detailed study in this survey of the features of cream hauling discussed above. Creamery men were quite frank in their discussions of the problem, however, and on the whole would like to have a more standardized method of dealing with hauling costs. A thorough investigation with the whole-hearted support of the industry is necessary to bring to light all the facts of the situation. Lower cream trucking charges are essential if the benefits of having a large volume of output are to be obtained. This is indicated in the section of this report entitled "Creamery Returns."

CREAM TRANSPORTATION COSTS

The cash costs for cream gathering are presented in Tables 17 and 18. These tables present cash costs of trucking cream to factories, charges for railway express on cream, cartage costs from railway stations to creameries and bonuses paid by creameries on cream delivered to the factory by producers.* The amount of money involved for the last-mentioned item was not large. No attempt has been made to estimate the cost to farmers who delivered cream to the creamery. It was assumed that these farmers would be going to town on other business and in such cases the transport of cream would not entail any extra cost.

No information was obtained in the survey which would indicate the area from which each creamery obtained its cream supply. Information on distances farmers deliver cream, and areas served by truck or rail routes, is essential in order to determine the extent of the alleged overlapping of creamery districts. Some information is presented below indicating the average distances cream is transported. More detail, however, is required to present a complete picture of the situation.

About one-third of the cream received by the 78 creameries was trucked, one-third expressed by railroad, and the remainder delivered by the producers. As creameries increased in size the proportion of butterfat delivered by producers became smaller. In creameries in which the production of butter was less than 100,000 pounds, producers delivered 60.8 per cent of the cream, whereas in plants having an output in excess of 500,000 pounds, the amount delivered was 24 per cent of the total. Only 7.8 per cent of the cream used by city creameries was delivered by producers, while 51.1 per cent was expressed and 41.1 per cent was trucked. For town and village plants about 40 per cent was delivered, 30 per cent expressed, and 30 per cent trucked.

The cost of trucking in most cases was over 2 cents per pound butterfat, and averaged 2.25 cents for all cream trucked. The cost of railway express averaged 1.74 cents per pound butterfat. The cost of trucking, railway express and cartage amounted to 2.08 cents per pound butterfat for all cream so handled. The total charge divided by all cream used in the manufacture of butter amounted to 1.37 cents per pound butterfat. The total charge for small output

* As indicated above complete information on cream hauling costs was difficult to obtain. Some factories had separate accounts while in other factories the costs were distributed between "automobile accounts", "wages", "advances", "bad debts", etc. An effort was made to segregate cream hauling expenses and it is believed that on the whole the figures are representative.

factories was 0.84 cent compared with 1.66 cents for creameries having a production larger than 500,000 pounds, a difference of 0.82 cent. The cost of trucking to city plants averaged approximately 2.50 cents per pound butterfat, while express averaged 2.34 cents per pound. The average costs in town plants were 1.90 cents for trucking and 1.55 cents for express and for village factories 2.34 cents and 1.55 cents. The total gathering charge per pound of butterfat churned was 2.31 cents for city creameries, 1.15 cents for town creameries, and 1.23 for village factories.

The cash cost of gathering cream increased as volume of production became greater, the reason for this being that a greater proportion of the cream used in large volume factories had to be hauled by truck or expressed. It is obvious that producers who delivered their cream lived near the factory, and the area from which delivered cream was received was, therefore, limited. The city plants had a comparatively small proportion of butterfat delivered by producers, because those near enough to deliver their own product would likely be producing for the fluid milk market rather than shipping cream to the creamery. The average amounts of butterfat delivered by farmers to factories of various sizes, and to village, city and town plants are presented in Table 19. These figures indicate more clearly the amount of butterfat available within a radius near enough to the average creamery to be delivered by producers.

TABLE 17.—PROPORTION OF CREAM RECEIVED BY DIFFERENT METHODS OF TRANSPORTATION AND COSTS BY TRUCK AND EXPRESS FOR FACTORIES CLASSIFIED ACCORDING TO VOLUME OF BUTTER PRODUCED—PRAIRIE PROVINCES 1933

Production per factory in thousands of pounds	Percentage of butterfat			Cost per lb. butterfat		Total transport† cost per lb.	
	Trucked *	Ex- pressed	Delivered *	Trucking	Express	Butterfat trans- ported	Butterfat churned
	%	%	%	cents	cents	cents	cents
Less than 100.....	16.6	22.6	60.8	2.66	1.66	2.14	0.84
100-199.....	18.4	23.9	57.7	1.86	1.66	1.81	0.76
200-299.....	32.1	24.2	43.7	2.32	1.45	2.00	1.11
300-399.....	33.3	33.5	33.2	2.22	1.61	1.98	1.37
400-499.....	28.1	45.4	26.5	2.25	1.46	1.84	1.29
500 and more.....	33.9	42.1	24.0	2.27	1.97	2.25	1.66
All factories.....	31.3	34.8	33.9	2.25	1.74	2.08	1.37

* "Delivered" means hauled to factory by the producer while "Trucked" means hauled by hire at the factory owners' or producers' expense.

† Total cost of transportation includes cost of trucking, express, cartage and bonuses paid on delivered cream.

TABLE 18.—PROPORTION OF CREAM RECEIVED BY DIFFERENT METHODS OF TRANSPORTATION AND COSTS BY TRUCK AND EXPRESS FOR FACTORIES CLASSIFIED ACCORDING TO PLACE OF OPERATION—PRAIRIE PROVINCES 1933

Place of operation	Percentage of butterfat			Cost per lb. butterfat		Total transport cost per lb.†	
	Trucked *	Ex- pressed	Delivered *	Trucking	Express	Butterfat trans- ported	Butterfat churned
	%	%	%	cents	cents	cents	cents
City.....	41.1	51.1	7.8	2.49	2.34	2.56	2.31
Town.....	28.0	33.9	38.1	1.90	1.55	1.76	1.15
Village.....	30.2	30.0	39.8	2.34	1.55	2.04	1.23
All factories.....	31.3	34.8	33.9	2.25	1.74	2.08	1.37

* "Delivered" means hauled to factory by the producer while "Trucked" means hauled by hire at the factory owners' or producers' expense.

† Total cost of transportation includes cost of trucking, express, cartage and bonuses paid on delivered cream.

TABLE 19.—AVERAGE AMOUNT OF BUTTERFAT DELIVERED BY THE PRODUCER TO CREAMERIES IN DIFFERENT PRODUCTION GROUPS AND TO CREAMERIES CLASSIFIED ACCORDING TO PLACE SITUATED—PRAIRIE PROVINCES 1933

Production per factory in thousands of pounds	Average pounds of butterfat delivered	Per cent of total butterfat churned
	lbs.	%
Less than 100.....	43,433	60.8
100-199.....	74,879	57.7
200-299.....	89,471	43.7
300-399.....	92,858	33.2
400-499.....	95,871	26.5
500 and more.....	144,281	24.0
All factories.....	94,819	33.9
City factories.....	35,262	7.8
Town factories.....	122,472	38.1
Village factories.....	92,235	39.8

The cost of transporting cream for various distances is given in Tables 20 and 21. As indicated in these tables the rates have been taken from the Railway Tariff Rates for cream expressed, and from the Saskatchewan Public Utility Board Regulations for cream trucked. In order to ascertain transportation costs it was assumed that the average 5-gallon cream can contains 14 pounds of butterfat. On this basis the cost of trucking cream 25 miles amounted to 1.78 cents per pound butterfat; for 50 miles the cost was 1.93 cents; for 75 miles 2.21 cents and for 100 miles 2.57 cents. The average cost of trucking cream according to the survey figures (Table 17) was 2.25 cents per pound butterfat. According to Saskatchewan rates a cost of 2.25 cents per pound would indicate that cream was trucked an average distance of about 75 miles to the factories.

The rates for railway express for cream increases from 1.07 cents per pound butterfat to 1.86 cents when the distance increases from less than 25 to 75-100 miles. The average express rate for all cream transported this way was 1.74 cents (Table 17), indicating that the average distance cream was expressed was between 75 and 100 miles.

TABLE 20.—COST OF EXPRESS ON CREAM IN THE THREE PRAIRIE PROVINCES UNDER SPECIAL LOCAL AND COMPETITIVE TARIFF No. 23-A*

Distance	Cost for 5-gal. can	Cost per lb. butterfat†
	cents	cents
25 miles and under.....	15	1.07
Over 25 miles to 50 miles.....	18	1.28
" 50 " 75 ".....	22	1.57
" 75 " 100 ".....	26	1.86
" 100 " 150 ".....	24	2.43
" 150 " 200 ".....	42	3.00
" 200 " 250 ".....	50	3.57
" 250 " 300 ".....	58	4.14
" 300 " 350 ".....	66	4.71
" 350 " 400 ".....	74	5.28

* Issued by the Chairman, Express Traffic Association, Montreal, Quebec, October 31, 1931; applying locally between all points on the rails of the Canadian National Express and the Canadian Pacific Express in Alberta, Saskatchewan, Manitoba and Ontario (west of and including Port Arthur and Armstrong) when the distance does not exceed 400 miles.

† It is assumed that the average 5-gallon can contains 14 pounds of butterfat.

TABLE 21.—COST OF TRUCKING CREAM UNDER A SPECIAL FREIGHT TARIFF FOR CREAM IN THE PROVINCE OF SASKATCHEWAN BY OWNERS OF PUBLIC SERVICE VEHICLES ENGAGED IN TRANSPORTATION OF GENERAL MERCHANDISE*

Distance	Cost per 5-gal. can†	Cost including 5c. return of can charge	Cost per lb. butterfat‡
	cents	cents	cents
25 miles.....	20	25	1.78
50 ".....	22	27	1.93
75 ".....	26	31	2.21
100 ".....	31	36	2.57

* Source: Government of the Province of Saskatchewan, "The Public Utility Board Regulation Respecting Passenger, Express and Freight Traffic, Effective March 28, 1933", Page 7.

† The rates for owners not engaged in transport of general merchandise are as follows: for 25 miles, 22c.; 50 miles 26c.; 75 miles 31c.; 100 miles 37c. To this must be added 5c. for return of can.

‡ It is assumed that the average 5-gallon can contains 14 pounds of butterfat.

The Quality of Cream.—The quality of cream delivered to the 78 creameries is shown in Table 22. A total of 75.1 per cent of the cream graded "Table" or "Special," while 22.1 per cent graded "No. 1," and 2.8 per cent graded "No. 2."

The Quality of Butter.—The quality of butter produced in the 78 factories is presented in Table 23, which shows that 85.5 per cent of the butter graded No. 1, while 10 per cent graded No. 2, 4.3 per cent No. 3, and the remainder was "no grade." The percentage of No. 1 butter made increased progressively through each factory production group from 72.8 per cent in factories producing less than 100,000 pounds to 89.4 per cent in factories in which production exceeded 500,000 pounds. It would thus seem that more high quality butter is made in the larger factories than in the smaller ones.

TABLE 22.—QUALITY OF CREAM SUPPLIED BY PRODUCERS TO 78 FACTORIES IN THE PRAIRIE PROVINCES 1933

Production per factory in thousands of pounds	Number of factories	Percentages of various grades				
		Table*	Special	No. 1	No. 2	Off grade
	No.	%	%	%	%	%
Less than 100.....	4	1.5	75.1	22.5	0.9	—
100-199.....	14	33.0	39.0	25.9	2.1	—
200-299.....	22	33.0	43.8	20.9	2.2	0.1
300-399.....	19	46.9	27.4	21.7	3.9	0.1
400-499.....	5	51.2	27.9	16.5	4.4	—
500 and more.....	14	39.8	34.7	23.1	2.4	—
Total or average.....	78	39.8	35.3	22.1	2.8	—

* In the Province of Alberta all cream of a class equal to "Table", and not required for domestic use, is bought for churning cream and graded "Special".

TABLE 23.—QUALITY OF BUTTER PRODUCED IN 78 FACTORIES IN THE PRAIRIE PROVINCES 1933

Production per factory in thousands of pounds	Number of factories	Percentage of various grades			
		No. 1	No. 2	No. 3	No grade
	No.	%	%	%	%
Less than 100.....	4	72.8	25.8	1.2	0.2
100-199.....	14	75.6	19.2	4.7	0.5
200-299.....	22	86.7	8.7	4.3	0.3
300-399.....	19	82.1	12.4	5.4	0.1
400-499.....	5	86.6	9.6	3.7	0.1
500 and more.....	14	89.4	6.7	3.8	0.1
Total or average.....	78	85.5	10.0	4.3	0.2

Butter Production and Overrun.—Table 24 indicates that the overrun was 22.0 for the average plant. On the whole the variation between plants in various production groups was not great.

TABLE 24.—OVERRUN IN 78 FACTORIES IN VARIOUS PRODUCTION GROUPS PRAIRIE PROVINCES 1933

Production per factory in thousands of pounds	Average pounds of butter	Number of factories	Pounds butter made	Pounds butterfat churned	Per cent overrun
	lbs.	No.	lb.	lb.	%
Less than 100.....	87,702	4	350,810	285,859	22.7
100-199.....	156,744	14	2,194,418	1,809,513	21.3
200-299.....	248,371	22	5,464,155	4,486,965	21.8
300-399.....	340,467	19	6,468,865	5,301,388	22.0
400-499.....	440,018	5	2,200,091	1,816,576	21.1
500 and more.....	761,473	14	10,660,628	8,699,103	22.5
All factories.....	350,500	78	27,338,967	22,399,404	22.0

BUTTER SALES

The Prairie Provinces produce a surplus of creamery butter above local needs. Butter is shipped to the Vancouver market and to Eastern Canada, and some usually goes into the export market also. The average creamery sold approximately 83 per cent of the butter to wholesalers while 13.5 per cent was retailed and 3.6 per cent was sold to local jobbers. Retail sales in city plants averaged 43.3 per cent of the total, local jobbing sales made up 26.6 per cent and 30.1 per cent was sold to wholesalers. For town creameries 85.7 per cent was sold to wholesalers and 14.3 per cent was sold direct to consumers. Local retail sales constituted 4.4 per cent of the sales of village factories and the remainder was sold to wholesalers.

The receipts for butter f.o.b. factory amounted to \$4,847,925.79 for the 78 factories. The price per pound received by the average factory was 17.73 cents. The price received by size of factory and by city and country plants is discussed in the following section of this report.

TABLE 25.—PERCENTAGE OF BUTTER SOLD TO RETAIL TRADE, TO LOCAL JOBBERS AND TO WHOLESALE BY CREAMERIES CLASSIFIED ACCORDING TO LOCATION—PRAIRIE PROVINCES 1933

	Number of factories	Number of factories having information	Sales of butter					
			Local—Retail		Local—Jobbing		Wholesale	
			lb.	%	lb.	%	lb.	%
City creameries.....	8	7	1,228,911	43.3	753,776	26.6	854,075	30.1
Town creameries....	25	19	1,175,466	14.3	—	—	7,032,443	85.7
Village creameries...	45	33	435,977	4.4	6,562	—	9,540,965	95.6
All creameries...	78	59	2,840,354	13.5	760,338	3.6	17,427,483	82.9

TABLE 26.—PERCENTAGE BUTTER SOLD IN PRINT FORM BY CREAMERIES CLASSIFIED ACCORDING TO LOCATION—PRAIRIE PROVINCES 1933

	Number of factories	Number of factories having in- formation	Total sales	Sales in print form	Per cent sold in prints
			lb.	lb.	%
City creameries.....	8	8	5,280,976	4,454,638	84.4
Town creameries.....	25	20	8,912,928	1,214,466	13.6
Village creameries.....	45	36	10,792,863	1,211,741	11.2
All creameries.....	78	64	24,986,767	6,880,845	27.5

To arrive at the f.o.b. factory price the cost of selling and transporting butter were deducted from gross receipts. A number of creameries received payment for butter on an f.o.b. factory basis, and so had no record of selling costs. Other plants sold partly on an f.o.b. basis. It was not possible in the present study, therefore, to determine the marketing costs of butter. A detailed study of selling costs and methods would constitute an inquiry in itself.

CREAMERY RETURNS

The profit or loss per pound butter and per pound butterfat for creameries in various production groups is presented in Tables 27 and 28. The manufacturing cost as established in this study has been used in these calculations, so that the profit and loss will not be exactly the same as is presented in the various company operating statements. The selling price of butter is given on an f.o.b. factory basis. The fact that several creameries received payment on this basis and had no record of selling costs made this necessary. For other creameries, butter transportation costs, brokerage, storage and other selling charges were deducted from receipts for butter, in order to arrive at the factory price. The cost of printing butter was also deducted from receipts.*

TABLE 27.—RETURN PER POUND OF BUTTER IN FACTORIES IN VARIOUS PRODUCTION GROUPS—PRAIRIE PROVINCES 1933

Return or cost per pound of butter	Production per factory in thousands of pounds						
	Less than 100	100-199	200-299	300-399	400-499	500 and more	All fac- tories
	cents	cents	cents	cents	cents	cents	cents
Selling price f.o.b. factory.....	16.53	17.68	17.64	17.51	17.40	18.03	17.73
Net to producer.....	11.74	12.44	12.74	12.48	12.58	12.54	12.55
Hauling and express.....	0.66	0.61	0.89	1.09	1.02	1.29	1.08
Cartage.....	0.02	0.02	0.02	0.03	0.04	0.06	0.04
Commission on cheques.....	0.18	0.18	0.12	0.13	0.20	0.17	0.15
Total cost of butter fat.....	12.60	13.25	13.77	13.73	13.84	14.06	13.82
Manufacturing cost.....	4.82	3.89	3.52	3.62	3.37	3.18	3.45
Total cost of butter.....	17.42	17.14	17.29	17.35	17.21	17.24	17.27
Profit or loss.....	-0.89	0.54	0.35	0.16	0.19	0.79	0.46
Number of factories.....	4	14	22	19	5	14	78

* The calculated cost of printing butter averaged 0.58 cent per pound butter.

TABLE 28.—RETURN PER POUND BUTTERFAT IN FACTORIES IN VARIOUS PRODUCTION GROUPS—PRAIRIE PROVINCES 1933

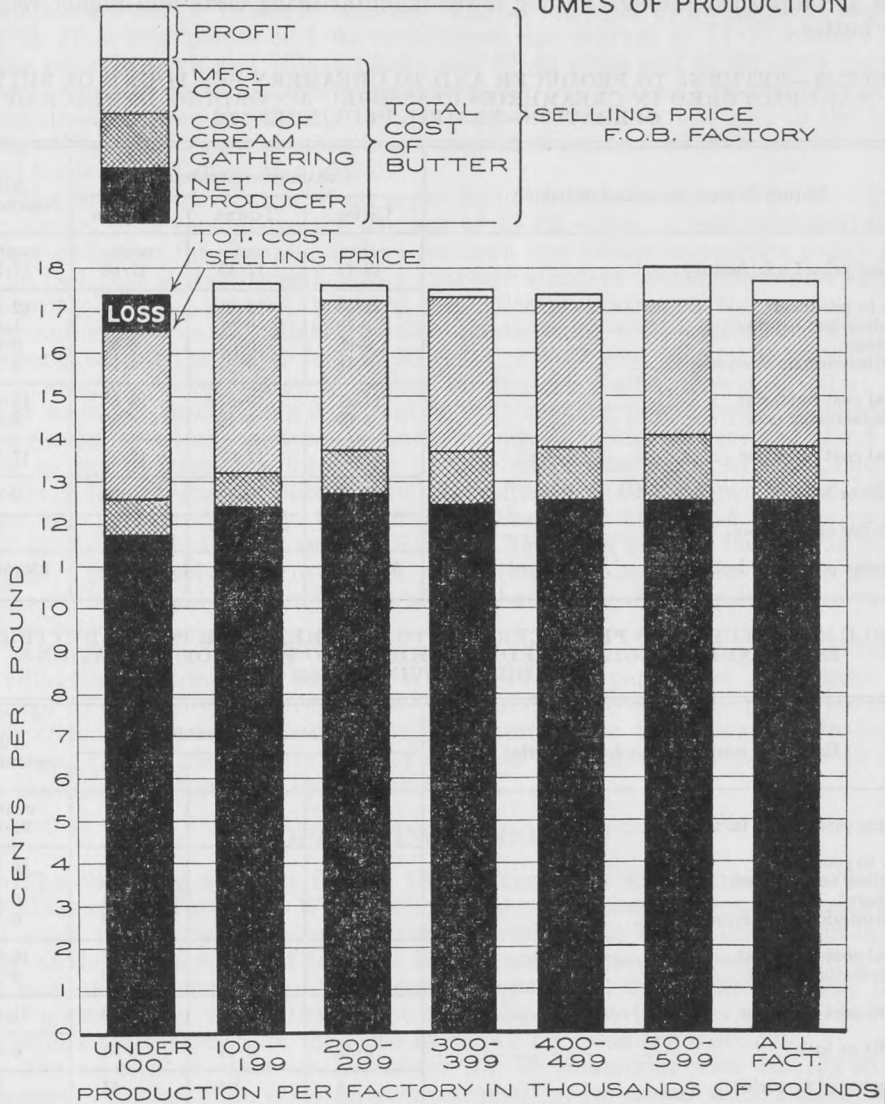
Return or cost per pound butterfat	Production per factory in thousands of pounds						
	Less than 100	100-199	200-299	300-399	400-499	500 and more	All factories
	cents	cents	cents	cents	cents	cents	cents
Selling price f.o.b. factory.....	20.29	21.45	21.48	21.37	21.07	22.10	21.64
Net to producer.....	14.40	15.09	15.51	15.23	15.24	15.36	15.31
Hauling and express.....	0.82	0.74	1.09	1.33	1.24	1.59	1.32
Cartage.....	0.02	0.03	0.02	0.04	0.05	0.07	0.05
Commission on cheques.....	0.22	0.21	0.15	0.16	0.23	0.21	0.19
Total cost butterfat.....	15.46	16.07	16.77	16.76	16.76	17.23	16.87
Manufacturing cost.....	5.92	4.72	4.29	4.42	4.06	3.91	4.21
Total cost of butter.....	21.38	20.79	21.06	21.18	20.82	21.14	21.08
Profit or loss.....	-1.09	0.66	0.42	0.19	0.25	0.96	0.56
Number of factories.....	4	14	22	19	5	14	78

The selling price f.o.b. factory for butter in solids averaged 17.73 cents per pound for all creameries. Creameries having volumes of less than 100,000 pounds received 16.53 cents, while those with more than 500,000 pounds production received 18.03 cents. Plants ranging from 100,000 to 500,000 pounds in capacity received from 17.40 to 17.68 cents on the basis of class averages. The cost of butterfat laid down at the factory on a per pound butter basis averaged 13.82 cents. The cost of this item increased from 12.60 to 14.06 cents as volume of output increased from less than 100,000 pounds to more than 500,000 pounds of butter. This difference of 1.46 cents was due to the higher price paid for butterfat by creameries producing more than 500,000 pounds of butter, and to the greater expense of gathering and transporting cream to the factories. The price paid for butterfat in the less than 100,000 pound production class was considerably below average, whereas in other groups the variation from the average was not so great. Therefore the chief factor responsible for the difference in cost of the butterfat laid down at the plant between the 100-199,000 pound production class, and the class producing more than 500,000 pounds was the increased cost of cream transportation. It was pointed out in a previous section of this report that the increase in transportation costs was due partly to a smaller proportion of cream being delivered by producers to the large factories.

The next item, manufacturing costs, decreased as volume of butter increased. The decrease in manufacturing costs practically equalized the increase in cost of transporting cream in factories producing more than 500,000 pounds as compared with factories having smaller outputs. The total cost of the butter was 17.24 cents per pound in the largest output plants, while it was 17.42 for plants having the smallest production. The average cost of the butter for all creameries was 17.27 cents per pound.

The profit per pound butter manufactured averaged 0.46 cent for all creameries. Factories having an output less than 100,000 pounds had a loss of 0.89 cent per pound butter, while the factories in which production exceeded 500,000 pounds had a profit of 0.79 cent or 0.33 cent above the average for all creameries. For creameries having a production less than 100,000 pounds producers received 14.40 cents per pound butterfat (11.74 cents on a butter basis) which was 0.91 cent per pound less than the average for all creameries. Cost of manufacturing in this group was 1.37 cents above the average; returns for butter were 1.20 cents below the average and despite lower cream transportation costs, large deficits occurred. In the next group, 100,000-199,000 pounds, pro-

CHART 3: COMPARISON OF COSTS OF BUTTER MANUFACTURE, PROFITS TO CREAMERIES & RETURNS TO PRODUCERS IN FACTORIES OF DIFFERENT VOLUMES OF PRODUCTION



ducers received 0.22 cent per pound butterfat less than the average, cream transportation costs were below average, and although the cost of manufacture was 0.44 cent greater than the average, profits were 0.10 cent above average. For factories in the third group (200,000-299,000 pounds capacity) producers received more than in any other group; the cost of the butter was approximately the same as the average for all creameries, returns for butter were 0.16 cent below average and the profit per pound butter was 0.14 cent less than for all creameries. In the next three groups higher cream transportation costs (due to more cream being transported) offset to some degree the lower costs of manufacture brought about by greater volume of production. The factories having 300,000-500,000

production received slightly less than the average for butter and mainly for this reason had lower than average profits per unit. Creameries with more than 500,000 pounds output paid more than the average to patrons for cream, had much higher transportation costs and received the highest average profits. This was accomplished through having lower manufacturing costs and higher returns for butter.

TABLE 29.—RETURNS TO PRODUCER AND TO CREAMERY PER POUND OF BUTTER MANUFACTURED IN CREAMERIES CLASSIFIED ACCORDING TO PLACE OF OPERATION—PRAIRIE PROVINCES 1933

Return or cost per pound of butter	Creameries situated in			All creameries
	Cities	Towns	Villages	
	cents	cents	cents	cents
Selling price f.o.b. factory.....	18.77	17.43	17.63	17.73
Net to producer.....	12.05	12.58	12.69	12.55
Hauling and express.....	1.79	0.91	0.98	1.08
Cartage.....	0.09	0.03	0.03	0.04
Commission on cheques.....	0.18	0.15	0.15	0.15
Total cost butterfat.....	14.11	13.67	13.85	13.82
Manufacturing cost.....	4.09	3.40	3.28	3.45
Total cost of butter.....	18.20	17.07	17.13	17.27
Profit or loss.....	0.57	0.36	0.50	0.46
Number of factories.....	8	25	45	78
Average pounds of butter.....	527,501	407,775	288,879	350,500

TABLE 30.—RETURNS TO PRODUCER AND TO CREAMERY PER POUND BUTTERFAT IN CREAMERIES CLASSIFIED ACCORDING TO PLACE OF OPERATION—PRAIRIE PROVINCES 1933

Return or cost per pound of butterfat	Creameries situated in			All creameries
	Cities	Towns	Villages	
	cents	cents	cents	cents
Selling price f.o.b. factory.....	23.07	21.27	21.47	21.64
Net to producer.....	14.82	15.35	15.45	15.31
Hauling and express.....	2.20	1.12	1.19	1.32
Cartage.....	0.11	0.03	0.04	0.05
Commission on cheques.....	0.22	0.18	0.19	0.19
Total cost butterfat.....	17.35	16.68	16.87	16.87
Manufacturing cost.....	5.03	4.15	3.99	4.21
Total cost of butter.....	22.38	20.83	20.86	21.08
Profit or loss.....	0.69	0.44	0.61	0.56
Number of factories.....	8	25	45	78
Average pounds of butter.....	527,501	404,775	288,879	350,500

Return to Producers.—The data given in Table 27 on a butter basis are presented in Table 28 on a butterfat basis. The return to producers per pound butterfat averaged 15.31 cents. Producers delivering cream to the group of factories having a production of 200-299,000 pounds of butter, received 15.51 cents, the highest for all groups and 0.21 cent above the average for all creameries. The return to producers for factories with outputs less than 100,000 pounds was 0.91 cent below the average for all plants and the lowest for any size group of creameries. For the second group of creameries (100,000-199,000 pounds) the returns to producer were 0.22 cent below average. The largest

returns occurred in the third group. Returns were slightly below average in the fourth and fifth size groups. In the largest size group producers received 15·36 cents, an amount which was 0·05 cent per pound butterfat above the average.

Returns to Country and City Plants.—The returns to country and city plants are set out in Tables 29 and 30. The selling price of butter f.o.b. factory was 18·77 in city plants or 1·04 cents above the average of 17·73 cents. The selling price in town and village plants was 17·43 cents and 17·63 cents respectively. Country factories had lower returns for butter than city plants because of the distance from the market. Only a small proportion was sold to the local trade. City plants, on the other hand, sold 43·3 per cent of their output to the retail trade (See Tables 25 and 26).

The total cost of butterfat on a per pound butter basis was 14·11 cents in city plants, 0·29 cent above the average of 13·82 cents. Cream transportation costs were higher for city plants than for town and village creameries partly due to the fact that it was necessary to go farther afield to obtain the cream supply and partly because patrons delivered a smaller proportion of the cream. Cost of manufacture was also higher in city plants, being 0·64 cent above average. The total cost of the butter was 18·20 cents or 0·93 cent above the average for all creameries. The relatively higher returns for butter, however, offset the higher costs, the profit being 0·57 cent or 0·11 cent per pound butter higher than the average for all creameries. In town creameries producers received about the same as the average, the total cost of the butter was below average, but the relatively low return for butter reduced profits to 0·10 cent per pound butter below the average. Village creameries on the other hand had greater profits than the average but less than city plants. The selling price of butter was below average. Manufacturing costs were lower than in the city and town plants. Producers were paid more in village plants than in creameries situated in towns and villages.

As indicated in Table 30 producers received 15·45 cents per pound butterfat in village creameries, this amount being 0·14 cent per pound more than the average received from all creameries. The amount received by producers from town creameries was 15·35 cents or 0·04 cent above the average. Producers delivering to city plants were paid 14·82 cents per pound butterfat or 0·49 cent less than the average paid by all creameries.

OPERATING ACCOUNTS

The operating accounts for the 78 creameries are summarized according to size of factory in Table 31. When setting up the operating accounts, an endeavour was made to include all items of expense pertaining to butter production in the body of the statements and to place income and expense of other enterprises at the foot of the statements. The accounts, therefore, will differ in detail from those presented by creameries at the time the creameries were visited, but the net profits for the year are the same as shown on creamery statements.*

The average receipts for butter for the 78 creameries were \$62,152.90 per creamery. Income from other enterprises, poultry, ice cream, milk and so forth, averaged \$16,375.20 per creamery. The net income from butter manufacture amounted to \$2,294.66 per creamery. When income and expenses from all enterprises were included, the average net profit was \$1,794.64. Creameries in the two groups of less than 100,000 pounds and between 400,000-499,000 pounds production suffered losses on the average, while those in other groups had gains averaging from \$1,007.16 to \$4,152.09 per creamery within the groups.†

* In cases where creameries had several departments, administrative expenses had to be allocated to butter manufacture and to other departments. This allocation was made with the aid of the managers and accountants at the time the records were taken.

† In some of the larger organizations having several branch creameries the butter stored in 1933, during the period of peak production, was not distributed evenly among the various creameries. One or two creameries were penalized while others gained because of this. The average net profit for the 400-499,000 pound production group would be somewhat higher if the returns from the storage policy had been equalized.

Costs as Percentage of Sales

The percentages of cost items to sales are presented in Table 32. For the average creamery, expenses of butter operations equalled 96·3 per cent of the receipts for butter. Net profits on butter operations, therefore, equalled 3·7 per cent of butter receipts. The various cost items in relation to receipts were as follows: butterfat f.o.b. factory, 77·9 per cent; plant wages, 5·1 per cent; plant expense, 9·4 per cent and administrative expense 3·9 per cent.

The effect of volume on costs is also portrayed in this table. As volume increased plant wages expressed as a percentage of butter receipts decreased from 8·2 per cent to 4·2 per cent for the group producing less than 100,000 to the group producing 500,000 and more. Plant expense likewise decreased from 12·8 to 8·5 per cent. Administrative expense and cost of butterfat fluctuated less than the other two items when expressed on this basis.

TABLE 31.—OPERATING ACCOUNTS SHOWING AVERAGES FOR FACTORIES IN VARIOUS PRODUCTION GROUPS

PRAIRIE PROVINCES 1933

	Production per factory in thousands of pounds						
	Less than 100	100-199	200-299	300-399	400-499	500 and more	All fac- tories
	\$	\$	\$	\$	\$	\$	\$
Sales of butter f.o.b. factory.....	14,499 93	27,720 39	43,805 29	59,622 71	76,544 58	137,326 42	62,152 90
Cost of butterfat—							
Net to patron.....	10,293 06	19,505 98	31,633 89	42,487 74	55,369 71	95,459 10	43,983 90
Hauling and express.....	583 91	953 78	2,217 91	3,702 54	4,506 36	9,854 99	3,786 31
Cartage.....	15 07	35 21	47 53	114 10	171 42	449 39	139 94
Commission cream cheques.....	159 77	274 03	314 18	457 85	859 32	1,276 33	541 70
Total.....	11,051 81	20,769 00	34,213 51	46,762 23	60,906 81	107,039 81	48,451 85
Plant wages.....	1,195 74	2,064 23	2,600 00	3,076 02	3,467 67	5,788 92	3,175 77
Plant expense—							
Supplies.....	277 66	315 56	553 06	657 60	1,170 38	1,378 12	709 43
Boxes and liners.....	428 33	696 95	1,006 44	1,411 39	1,977 80	3,411 16	1,513 77
Fuel, power and water.....	326 98	473 20	796 74	1,082 22	1,343 22	2,172 87	1,066 15
Ice.....	41 94	60 64	101 31	126 64	70 22	252 11	122 21
Taxes.....	107 21	71 14	178 30	288 64	250 16	500 45	244 73
Insurance.....	112 98	163 12	209 32	271 76	256 52	410 65	250 46
Grading.....	75 65	164 73	286 15	533 59	572 76	847 52	432 97
Repairs.....	136 67	287 62	349 42	494 89	437 05	763 01	442 70
Depreciation.....	336 77	402 98	682 88	916 74	1,617 10	1,814 23	934 81
Sundry.....	5 11	6 59	94 75	155 93	131 98	161 56	103 61
Total.....	1,849 30	2,642 53	4,258 37	5,939 40	7,827 19	11,711 68	5,820 84
Administrative expense—							
Salaries.....	350 13	319 28	581 08	824 06	957 73	2,441 90	939 57
Office supplies.....	41 02	97 21	210 96	193 77	273 21	3,341 06	204 98
Postage, telephone.....	94 98	148 37	224 43	485 33	622 09	1,197 65	467 86
Travelling.....	50 95	63 52	58 35	89 37	105 86	234 95	101 20
Head office.....	68 21	154 87	132 48	564 85	1,225 21	742 99	418 15
Sundry.....	27 53	102 28	115 96	260 35	136 39	854 57	278 02
Total.....	632 82	885 53	1,323 26	2,417 73	3,320 49	5,813 12	2,409 78
Total expense.....	14,729 67	26,361 29	42,395 14	58,195 38	75,522 16	130,353 53	59,858 24
Net profit from butter.....	-229 74	1,359 10	1,410 15	1,427 33	1,022 42	6,972 89	2,294 66
Add other income.....	-	992 27	16,281 55	4,359 57	7,771 92	55,963 43	16,375 20
Deduct head office interest.....	-229 74	2,351 37	17,691 70	5,786 90	8,794 34	62,936 32	18,669 86
Deduct other expense.....	-	104 71	53 02	540 43	1,299 55	1,227 64	469 04
Net profit for the year from all operations.....	-229 74	1,007 16	2,015 48	1,318 95	-145 82	4,152 09	1,794 64

TABLE 32.—ITEMS OF COST CHARGEABLE TO CREAMERY OPERATIONS EXPRESSED AS PERCENTAGE OF F.O.B. PLANT BUTTER SALES

PRAIRIE PROVINCES 1933

	Production per factory in thousands of pounds						
	Less than 100	100-199	200-299	300-399	400-499	500 and more	All factories
	%	%	%	%	%	%	%
Butterfat f.o.b. factory.....	76.2	74.9	78.1	78.4	79.5	78.0	77.9
Plant wages.....	8.2	7.5	6.0	5.2	4.5	4.2	5.1
Plant expense.....	12.8	9.5	9.7	10.0	10.2	8.5	9.4
Administration expense.....	4.4	3.2	3.0	4.0	4.4	4.2	3.9
Total cost.....	101.6	95.1	96.8	97.6	98.6	94.9	96.3
Net profit on butter operations.....	-1.6	4.9	3.2	2.4	1.4	5.1	3.7

SUMMARY

1. Approximately 45 per cent of the creamery butter produced in the three Prairie Provinces is manufactured in three months of the year: June, July, and August.

2. The average creamery included in this study had 642 regular patrons. The delivery of butterfat per patron approximated 440 pounds a year. On a butter basis this equals 540 pounds. There was a tendency for individual deliveries to be larger in plants having the highest output.

3. There were 5.2 dairy plants of various kinds situated within a 40-mile radius of the average creamery. Due to the requirements of the fluid milk market dairy plants were more numerous in large centres of population.

4. The average capital investment per creamery amounted to \$12,606, distributed as follows: land 5.1 per cent, building 52 per cent, and equipment 42.9 per cent. Investment per unit of output decreased as volume of production increased.

5. Volume of butter produced influenced unit cost of production. As volume rose from less than 100,000 pounds to more than 500,000 pounds, costs decreased from 4.82 cents per pound to 3.18 cents, a difference of 1.64 cents. This difference in cost, however, occurred mostly between the group of factories producing less than 100,000 pounds and the group producing 100-199,000 pounds, which accounted for 0.93 cent of the decrease. The average cost to manufacture butter was 3.45 cents per pound. Plant wages and overhead expenses per unit of product decreased relatively as volume of production rose. The cost of materials and miscellaneous items remained fairly constant and apart from the group containing the smallest output factories, administrative costs showed a tendency to rise as volume increased.

Manufacturing costs per unit were higher in city creameries than in those situated in towns and villages despite the fact that volume of production was higher in the city plants. City plants had higher unit overhead and administrative costs. Country plants were selected at random in order to obtain an average production equal to city creameries. The result of this comparison was as follows: manufacturing costs in cities was 4.09 cents per pound, towns 3.20 cents, and villages 3.10 cents. Eliminating city plants from the comparison of volume and costs, the difference between the smallest (less than

100,000 pounds) and the largest (more than 500,000 pounds) production groups was wider—1.87 cents in comparison to 1.64 cents. Here again, however, the largest decrease occurred between the group of factories with the smallest production and the factories in the next production group. The average cost of production, excluding city plants, was 3.33 cents compared with 3.45 cents when city plants were included.

About one-third of the cream received by the 78 creameries was trucked, one-third expressed by railroad, and the remainder delivered by producers. As volume of butter output increased the proportion of farmer-delivered cream decreased. The cost of trucking cream in most cases exceeded 2 cents per pound butterfat and averaged 2.25 cents for all cream trucked. Railway express averaged 1.74 cents per pound butterfat. The cost of trucking, express, and cartage amounted to 2.08 cents for all cream so handled. The total charge divided by all cream used in the manufacture of butter amounted to 1.37 cents per pound butterfat. No charge has been included for farmer-delivered cream. As volume of production increased from less than 100,000 pounds to more than 500,000 pounds, cash transportation costs on all butterfat rose from 0.84 cent to 1.66 cents per pound. It is necessary to point out, however, that 60.8 per cent of the butterfat was delivered by producers without cost to the creameries in the group producing less than 100,000 pounds, while in the group producing more than 500,000 pounds only 24 per cent of the cream was farmer-delivered. According to official express rates on cream for various distances, the average distance cream was expressed for the above costs was 75 to 100 miles. Official trucking rates for Saskatchewan indicated that, on the basis of the above rates, the average distance cream was trucked was 75 miles.

7. Approximately 75 per cent of the cream delivered to creameries graded "table" or "special" while 22.1 per cent graded "No. 1" and 2.8 per cent graded "No. 2."

8. Fully 85.5 per cent of the butter manufactured graded No. 1—the highest grade—while 10 per cent graded No. 2, and the remainder graded No. 3 or "no grade." The percentage of No. 1 butter increased as volume of butter production per factory increased.

9. The overrun was 22 per cent for the average factory.

10. The selling price f.o.b. factory for butter in solids averaged 17.73 cents per pound for all creameries. City creameries received 18.77 cents f.o.b. factory while town and village creameries received 17.43 cents and 17.63 cents respectively. Higher prices were received in city plants because of proximity to a market. City plants sold 84.4 per cent in print form. Local retail sales made up 43.3 per cent, local jobbing sales 26.6 per cent, and sales to wholesalers 30.1 per cent of total sales by city plants. Village plants only marketed 4.4 per cent to the local retail trade and sold 95.6 per cent to wholesalers. The comparative figures for town creameries were 14.3 per cent local retail and 85.7 per cent wholesale.

11. The return to producers per pound butterfat averaged 15.31 cents. Producers delivering to town and village creameries received a higher return than those patronizing city plants. This was due mainly to the fact that only 7.8 per cent of cream deliveries to city creameries were made by farmers direct, whereas in country plants approximately 40 per cent of the cream was farmer-delivered.

12. The profit per pound butter manufactured averaged 0.46 cent for all creameries. The manufacturing cost as established in this study, was used in the calculation of profit and loss, and therefore the figures are not exactly the same as are shown in the various company operating statements. The cost of

butterfat laid down at the factory on a per pound butter basis averaged 13.82 cents. This was considerably below average in factories producing less than 100,000 pounds of butter, and was due to lower than average payments to patrons and also low cash cream transport costs because of the high proportion of direct farmer deliveries. With increased volume cash cream transport costs rose, causing the cost of butterfat f.o.b. factory to be higher than average in the group producing 500,000 pounds and more. Manufacturing costs decreased as volume of production increased. The combined cost of butter averaged 17.27 cents for all plants and costs for the various production groups of factories ranged within a narrow margin of this figure. The highest cost, 17.42 cents, occurred in the group of factories producing less than 100,000 pounds, and the lowest, 17.14 cents, in the next production group. The savings made in manufacturing cost in the larger output factories were offset by the increase in cash transportation costs as volume of output increased. As previously stated, cash transportation costs rose as volume increased because direct cream deliveries by the farmer decreased in proportion to total deliveries and because of the necessity of going farther afield for the increased cream supply. For the group of factories in which production exceeded 500,000 pounds however, the price received for butter was considerably higher than the average (18.03 cents in comparison to 17.73 cents) so that the net profit for this group was 0.79 cent per pound butter in comparison to 0.46 cent for all factories. Factories of 100,000-199,000 pounds output showed an average profit of 0.54 cent per pound butter while those in the next three groups had average net profits less than the average for all groups. The group of factories in which production was less than 100,000 pounds showed a loss of 0.89 cent per pound, the higher than average manufacturing costs and low return for butter being the causes.

The total cost of butter was 18.20 cents in city plants or 0.93 cent above the average for all creameries. Producers who shipped to city creameries received less than the average price, due to the small proportion of farmer-delivered cream. Manufacturing costs were higher than average and cream transportation costs were considerably above average owing to the distance cream was transported and the relatively small direct producer deliveries. Higher returns for butter, however, netted city creameries a profit of 0.57 cent which was higher than average and above town and village creameries. Town and village creameries had a lower total cost of butter than did city plants. Lower cash cream transport costs and lower manufacturing costs were responsible for this. Profits were smaller in country creameries in comparison to city plants because of lower f.o.b. factory returns for butter.

13. The average receipts for butter, f.o.b. factory, for the 78 creameries were \$62,152.90 per creamery. Income from other enterprises, poultry, ice-cream, milk and so forth, averaged \$16,375.20 per creamery. The net income for butter operations amounted to \$2,294.66 per creamery. When income and expenses from other enterprises were accounted for the average net profit for total plant operations was \$1,794.64. Creameries in the groups producing less than 100,000 pounds and those producing between 400,000-499,000 pounds suffered losses on the average, while those in other groups had gains averaging from \$1,007.16 to \$4,152.09 per creamery within the groups.

CONCLUSIONS

A definite relationship was found to exist between volume of output and cost per pound of manufacturing butter in Prairie Province creameries in 1933. A difference of 1.64 cents in cost per pound occurred between plants in which production was less than 100,000 pounds and creameries having a production more than 500,000 pounds. Omitting the creameries in which production was less than 100,000 pounds, however, the difference between the group producing

100,000-199,000 pounds and those producing more than 500,000 pounds was 0.71 cent per pound. It is probable that costs per unit would show a further decrease from that indicated if records from more large output creameries could have been obtained.

It is necessary to point out as a qualification to the above that manufacturing costs in creameries situated in large population centres as compared with those in smaller centres were high, despite the fact that volume of production was greater in creameries situated in the large population centres. Higher overhead and administrative costs were responsible for this difference. From the standpoint of the creamery business as a whole however, it may be said that costs of manufacturing butter could be reduced if it were made in larger creameries than is the case at present in many districts throughout the three Prairie Provinces. Especially is this true for creameries having an output less than 100,000 pounds of butter per annum.

The cost of gathering cream is of vital concern to creamery operators in the Prairie Provinces. Dairying is not a major enterprise on the majority of Prairie Provinces' farms and the average delivery of butterfat per patron in this study was only 440 pounds a year. Coupled with this is the fact that farm population density is low. Owing to these factors the cost of gathering the raw product is high. Creamery districts must necessarily be large in order to obtain sufficient cream to ensure minimum manufacturing costs. Where farmers delivered a large proportion of the cream direct to the creameries cash costs of hauling cream were lowered. In small output creameries producers delivered from 40 to 60 per cent of the butter fat direct, and as farmers supplying such creameries generally visited town once a week on other business, the delivery of cream in this way did not necessarily occasion any extra expense. Only 24.0 per cent of the cream was delivered direct by the producers to large factories. The increase in the cash cost of transporting cream as factory volume increased, offset to a considerable extent the savings made in manufacturing costs by having a large volume of output. Excluding factories smaller than 100,000 pound production, the total cost of the butter did not differ greatly between all other size groups of factories.

A reduction in unit hauling costs might conceivably occur if dairy farming became a major farm enterprise on a greater number of farms in the three Prairie Provinces. Any change in this direction, however, is likely to be a gradual one, since vast portions of the country are more naturally adapted to other types of farming.